STEEL The Metalworking Weekly

AUGUST 28, 1961

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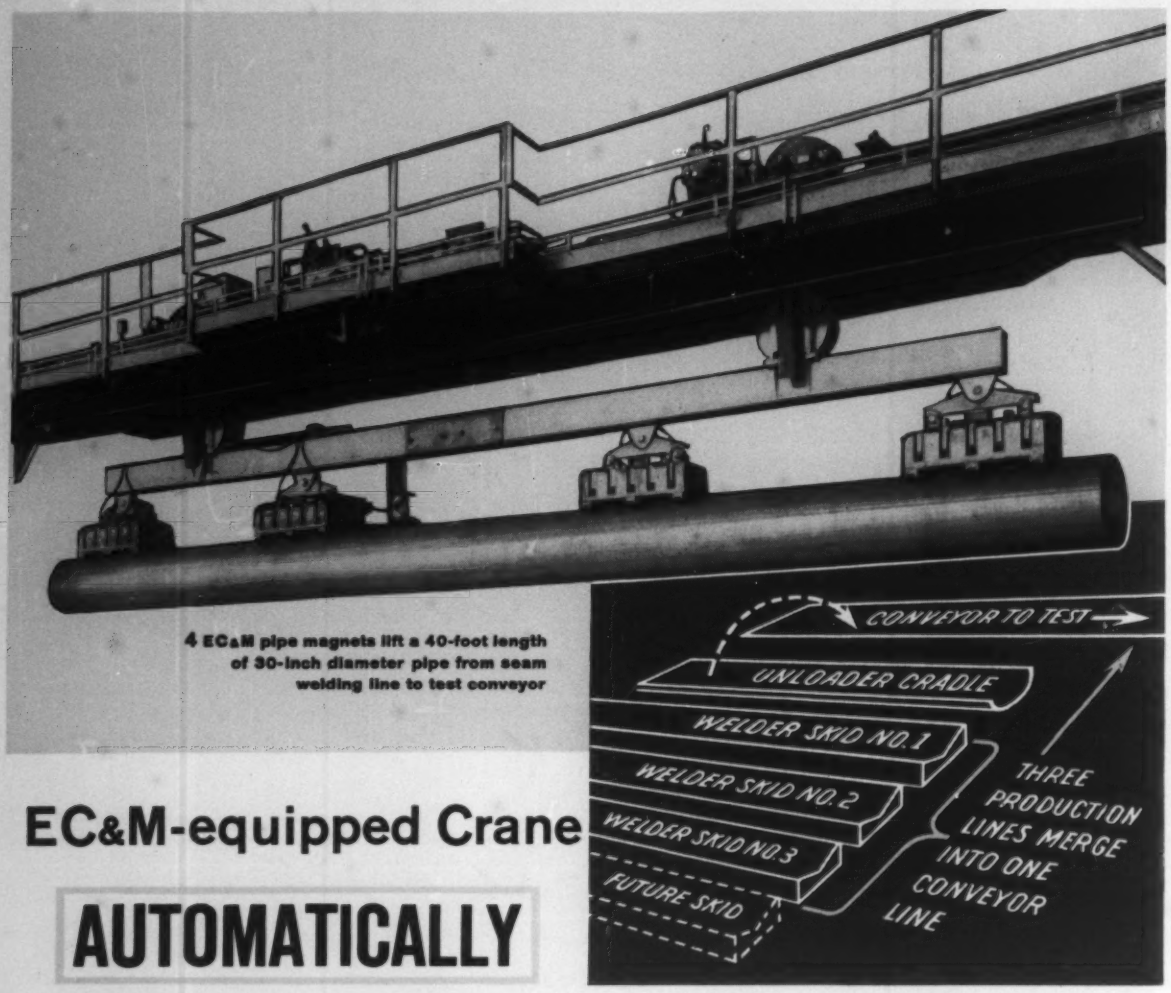

4 EC&M pipe magnets lift a 40-foot length of 30-inch diameter pipe from seam welding line to test conveyor

EC&M-equipped Crane

AUTOMATICALLY

Detects Pipe - Delivers It - Prevents Pile-Ups!

Pipe initiates the movement of this new automatic crane at Bethlehem Steel Company's Line Pipe Mill in Steelton, Pa. The crane operates only when necessary, then returns to the home position over the unloader cradle—remains there until new pipe commands further movement.

While operating, the crane records the presence of pipe as it arrives on any skid, and removes the pipe in the order in which it arrived. The EC&M Memory Unit on the crane will accommodate the addition of a future fourth welder skid without modification.

Do you have material handling operations which can be improved by an automatic control system? EC&M-engineered control can be built for any material handling application. Let's discuss it (without obligation).

NEW BROCHURE 1311 describes in detail the successful material handling solution at the Bethlehem-Steelton plant
Write for your copy—Square D Company, EC&M Division, 4500 Lee Road, Cleveland 28, Ohio

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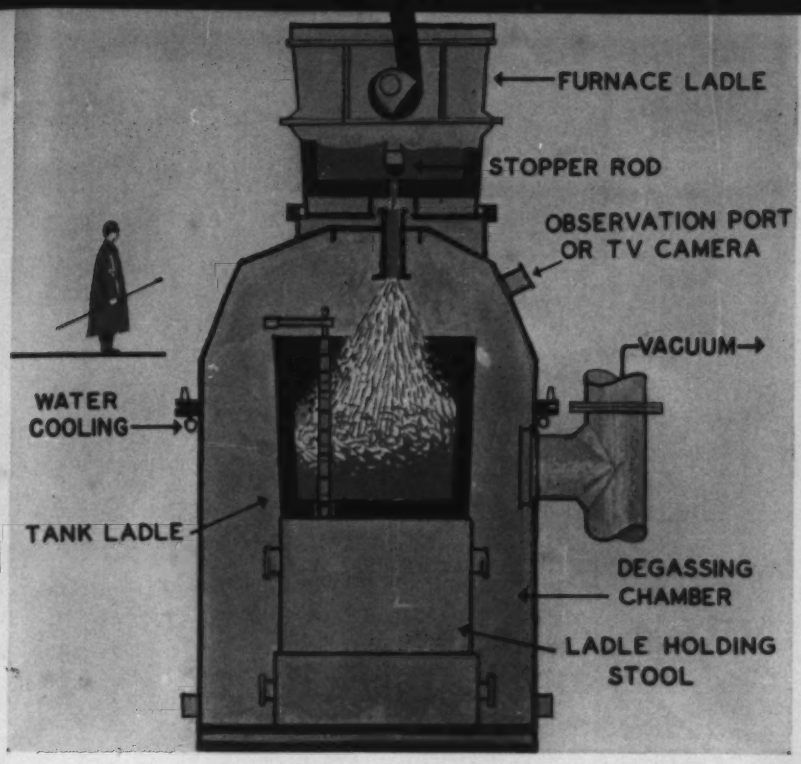
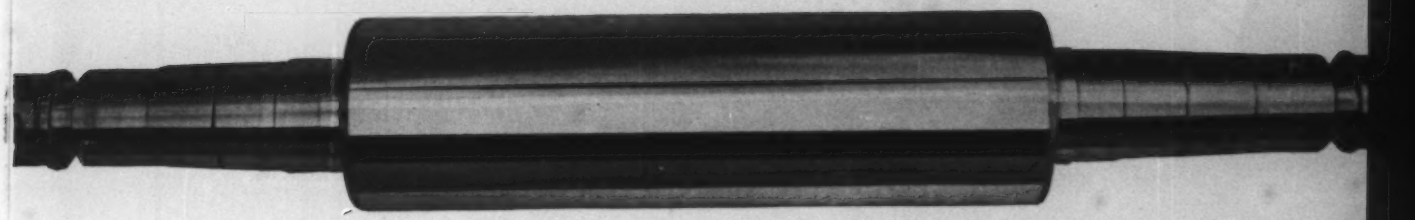
EC&M DIVISION • CLEVELAND 28, OHIO

wherever electricity is distributed and controlled

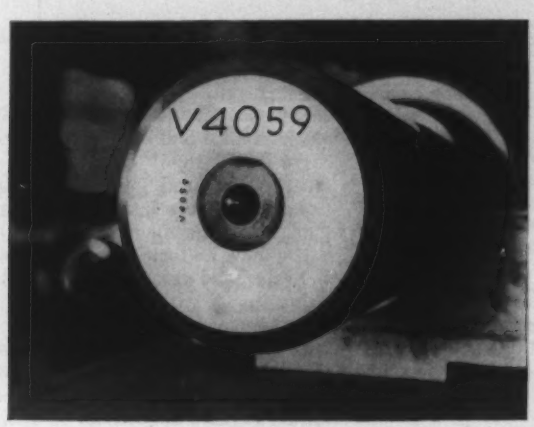
6740



Our advanced steel-pouring techniques now permit us to pour molten steel from a furnace ladle to a secondary ladle within a vacuum chamber, and thereby remove harmful gases. The secondary ladle is then removed from the chamber and ingots of suitable size for hardened steel rolls can be cast under a blanket of inert gas.



When you use Bethlehem vacuum-degassed hardened steel rolls, you add many tons of production per roll. Made from steel that's sounder, tougher, cleaner . . . these rolls have proved their longer service in some of the biggest rolling mills in the country. As of today, there are over 3000 in service. There's no price extra! And deliveries are excellent. For all the money-saving details, get in touch with our nearest sales office.



LOOK FOR THIS "V" STAMP on the ends of the rolls you buy . . . "V" is for vacuum. You'll find this permanent identification on every Bethlehem roll . . . because Bethlehem forges hardened steel rolls **only** from vacuum-degassed steel.

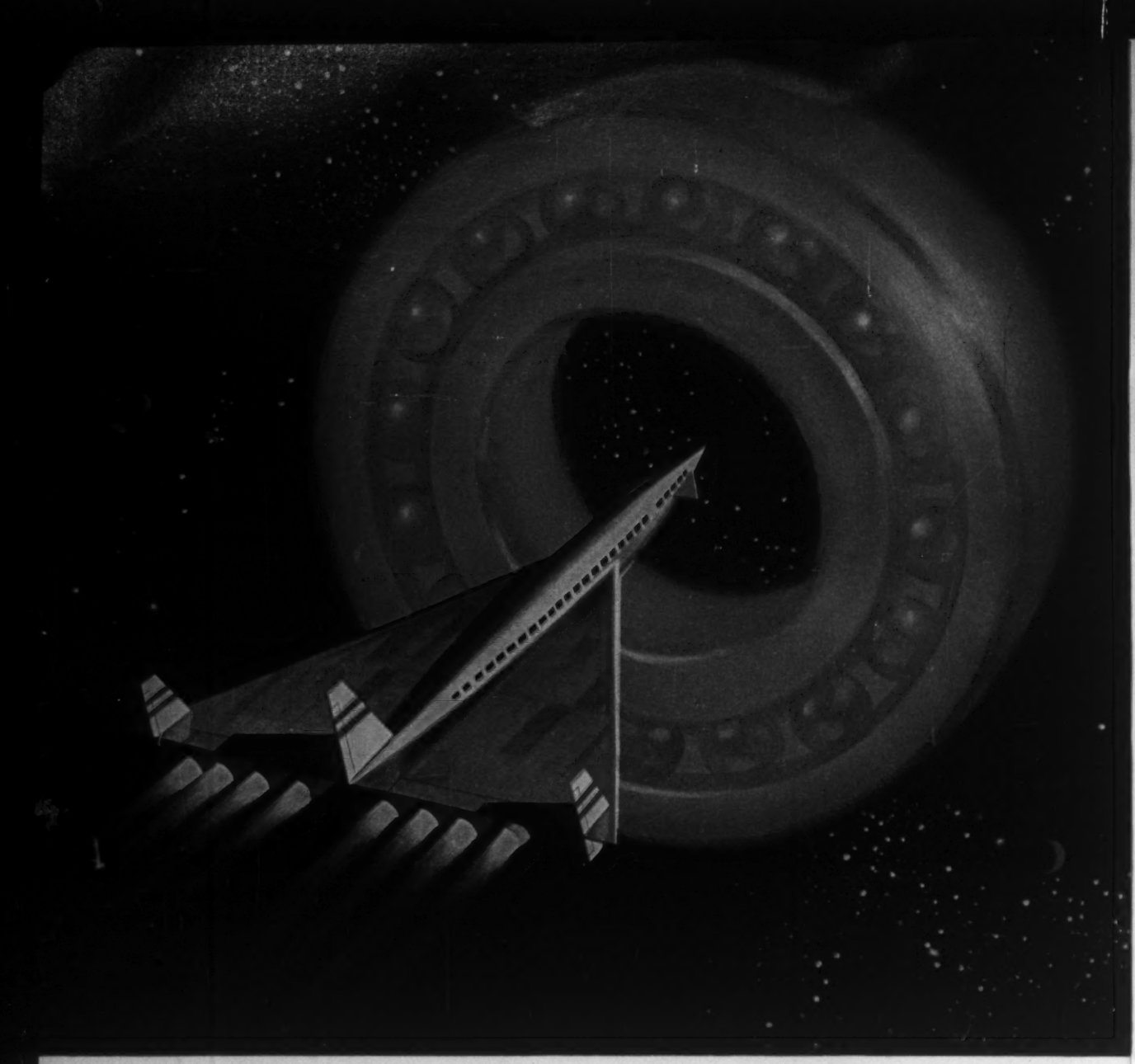
Steel

for Strength
. . . Economy
. . . Versatility

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA. *Export Sales: Bethlehem Steel Export Corporation*

BETHLEHEM STEEL

BETHLEHEM STEEL



BEARING WITH A RED HOT FUTURE

SKF MOTION ENGINEERING

Advanced ball and roller bearing technology

On special test equipment in SKF's research laboratory, experimental ball and roller bearings are run at temperatures up to 1000° F and above—conditions under which steel becomes red hot and loses its strength, while conventional lubricants burn or boil away. To meet these problems, bearings made of special heat-resisting alloys and exotic new materials are tested and evaluated. New ideas in design and new approaches to lubrication are constantly being investigated.

Bearings to resist extremely high temperatures are needed for improved, high performance jet engines, gas turbines and other equipment. Special SKF bearings have been tested successfully in environments at about 1000° F. Under certain conditions of operation, much higher temperatures are practical.

Research like this is your assurance that SKF will always keep pace with demands for the highest possible performance in all major types of rolling contact bearings —ball, cylindrical roller, spherical roller, tapered roller and precision miniature. SKF Industries Inc., Philadelphia 32, Pa.

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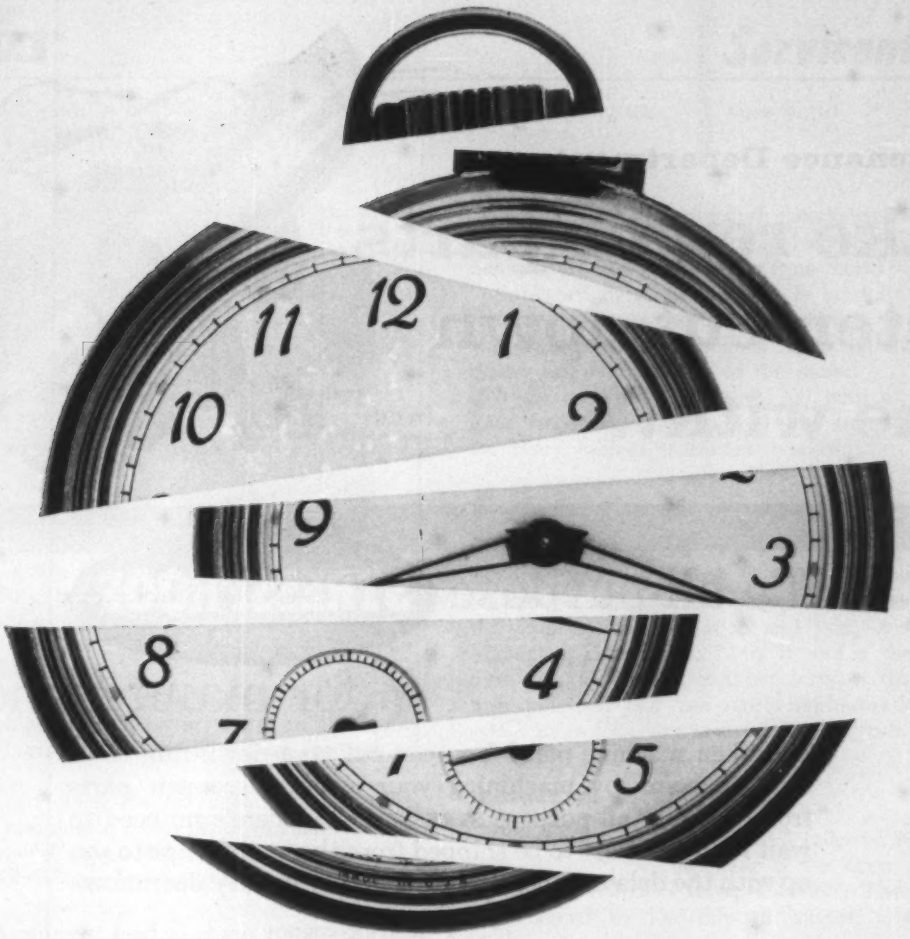


For General Time Corporation

PRODUCTION ANSWERS FALL INTO PLACE, SAVE $56 per 1,000 UNITS WITH SCOTCH-WELD®

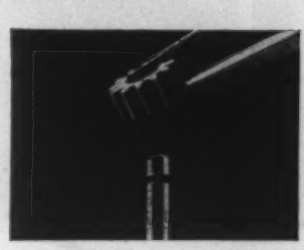
BRAND STRUCTURAL ADHESIVES

Before a SCOTCH-WELD Brand Structural Adhesive joined the assembly line, attaching tiny gear heads to mounting pins was a tedious and costly operation for Haydon Division, General Time Corporation, Torrington, Conn. High-temperature brazing frequently distorted gear configuration, warped shafts, upset metal hardness. A 100% inspection, with rejects aplenty, was required to assure watch-like accuracy in the final product—synchronous timing motors.

A 3M Field Engineer suggested SCOTCH-WELD EC-1386. In production, bonding gears to shafts with this epoxy-type adhesive eliminated the distortion-causing heat problem, ended high rejects, made 100% inspection unnecessary. The void-filling properties of EC-1386 reduced tolerances required between shaft and gear. And best of all, savings of $56.37 per thousand assemblies resulted!

Chances are your company can save money, speed production, simplify putting new designs into production by taking advantage of SCOTCH-WELD Structural Adhesives or other adhesive products developed by dynamic 3M research. Ask the nearby 3M Field Engineer to show you how! Or write AC&S Division, 3M Co., Dept. SBEE-81, St. Paul 6, Minn.

"SCOTCH-WELD" is a reg. TM of 3M Co.



SCOTCH-WELD EC-1386 simplifies bonding gear to shaft by eliminating high brazing heat that distorted the tiny parts, changed metal hardness.

ADHESIVES, COATINGS AND SEALERS DIVISION

MINNESOTA MINING AND MANUFACTURING COMPANY

...WHERE RESEARCH IS THE KEY TO TOMORROW

3M COMPANY

Maintenance Departments

make repair parts faster, cut down time with..

LaSalle all-purpose STRESSPROOF STEEL BARS ...for maintenance

A broken machine part? You can cut your down-time from days to hours by machining your own replacement parts from LaSalle all-purpose STRESSPROOF. There's no need to wait for a new part to be shipped from the factory...or to put up with the delays of heat treating and secondary operations.

Here's why STRESSPROOF *will help you get back into production faster (and minimize future breakdown possibilities):*

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- It's strong . . . 100,000 psi.
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- It costs less than heat treated in-the-bar alloys . . . and you can make most of your parts from just one stock of all-purpose STRESSPROOF.

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24-Page booklet tells complete story of all-purpose STRESSPROOF

Use this coupon to request your copy of "How to make your own machine and repair parts quicker and easier." It tells how to make parts like these easier and faster: *arbors • axles • bolts • bushings • fasteners • gears • spindles • shafts • studs, etc.*

La Salle STEEL CO. 1414 150th Street Hammond, Indiana

Name_____

Title_____

Company_____

Address_____

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The Two Toms

Tom Welsh, left, and Tom Bryan are STEEL's art editors. Tom B. chiefly handles the covers and graphic presentation of news and market articles. Tom W. is in charge of presentation for technical articles.

Tom B. joined Penton's art department in 1954 and was named an art editor in 1956. He is a 1941 graduate of the Cleveland Institute of Art.

Tom W. joined the art department in 1954 and was also named an art editor in 1956. A 1951 graduate of Cooper School of Art, he also attended Cleveland Institute of Art.

Winner

S. J. Cole, sales manager for Industrial Nut Corp., Sandusky, Ohio, has earned a second $500 from STEEL. He got his first $500 as the December winner in our 1960 Usership Idea of the Month contest. An ad by American Welding & Mfg. Co. (Dec. 19, p. 60) sparked an idea for a new snap ring.

In the usership contests during 1960, 11 readers picked up a total of $10,500—one winner of the first $500 didn't win the second because he didn't submit proof of attaining the objectives stated in his prize winning entry. Some 96 other readers earned honorable mentions and received engraved desk lighters that commemorate their achievements.

Accident

A steelworker is less apt to have an accident on the job than he is at home.

In fact, accidents in U. S. homes claim 27,000 lives and cause nearly 4 million disabling injuries each year, costing the nation billions of dollars.

To help stem that tide, the steel industry has drawn on its half century of experience in overcoming hazards to prepare a booklet, "For Greater Safety at Home—Take a Tip from Steel."

Published by American Iron & Steel Institute, the booklet shows the home owner how to apply the same practices that have made the steel industry one of the safest in the nation.

It set a safety record in 1960 with an accident frequency of only 3.14 lost time injuries for every million manhours worked.

Big Issue Coming Up

Sound the trumpets! Next week is the big week. Besides containing Labor Day, we will publish, on Sept. 4, our fourth Impact Issue—a study on the problem of Automation and Jobs. Associate Managing Editor John Morgan and a team of nine editors have put together a report that can help you sell and use more mechanization to create more jobs, not less, in the long run.

Incidental Intelligence

Item: A googol is the figure 1 followed by 100 zeros, or 10^{100}. A googolplex is the figure 1 followed by a googol of zeros, or $10^{10^{100}}$. The terms were coined by Dr. Edward Kasner, a U. S. mathematician.

Item: President Lincoln was once mistaken for a sanitation officer when he reported for a meeting with General Grant.

What Is It?

Larry Megow, our Honorary Editor No. 2, didn't enjoy being fooled by our last "What Is It?" (The aluminum rack that turned out to be a chair.) So he submits one. The two items pictured above are almost perfect ball and socket joints which required no manhours to manufacture. What are they?

STEEL, the metalworking weekly, is selectively distributed without charge to qualified management personnel with administrative, production, engineering, or purchasing functions in U. S. metalworking plants employing 20 or more. Those unable to qualify, or those wishing home delivered copies, may purchase copies at these rates: U. S. and possessions and Canada, $10 a year; all other countries, $30 a year; single copies, 50 cents. Metalworking Yearbook issue, $2. Published every Monday by The Penton Publishing Co., Penton Bldg., Cleveland 13, Ohio. Accepted as controlled circulation publication at Cleveland, Ohio.

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(precision tolerance)

- Stainless steel 18-8, type 303
- Diams: .0312 through .500
- Lengths: 3/32" through 2½"
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- "Specials" manufactured promptly
- Full range raw material on hand

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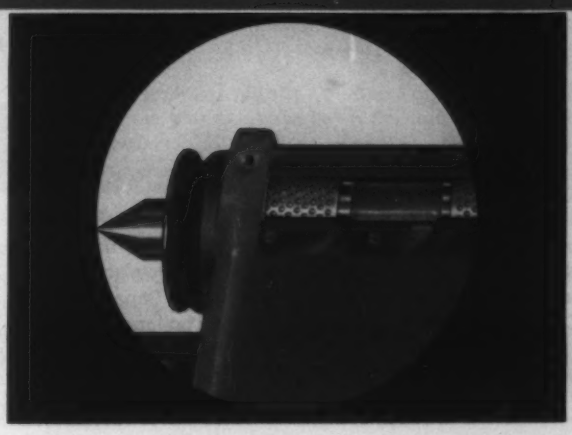

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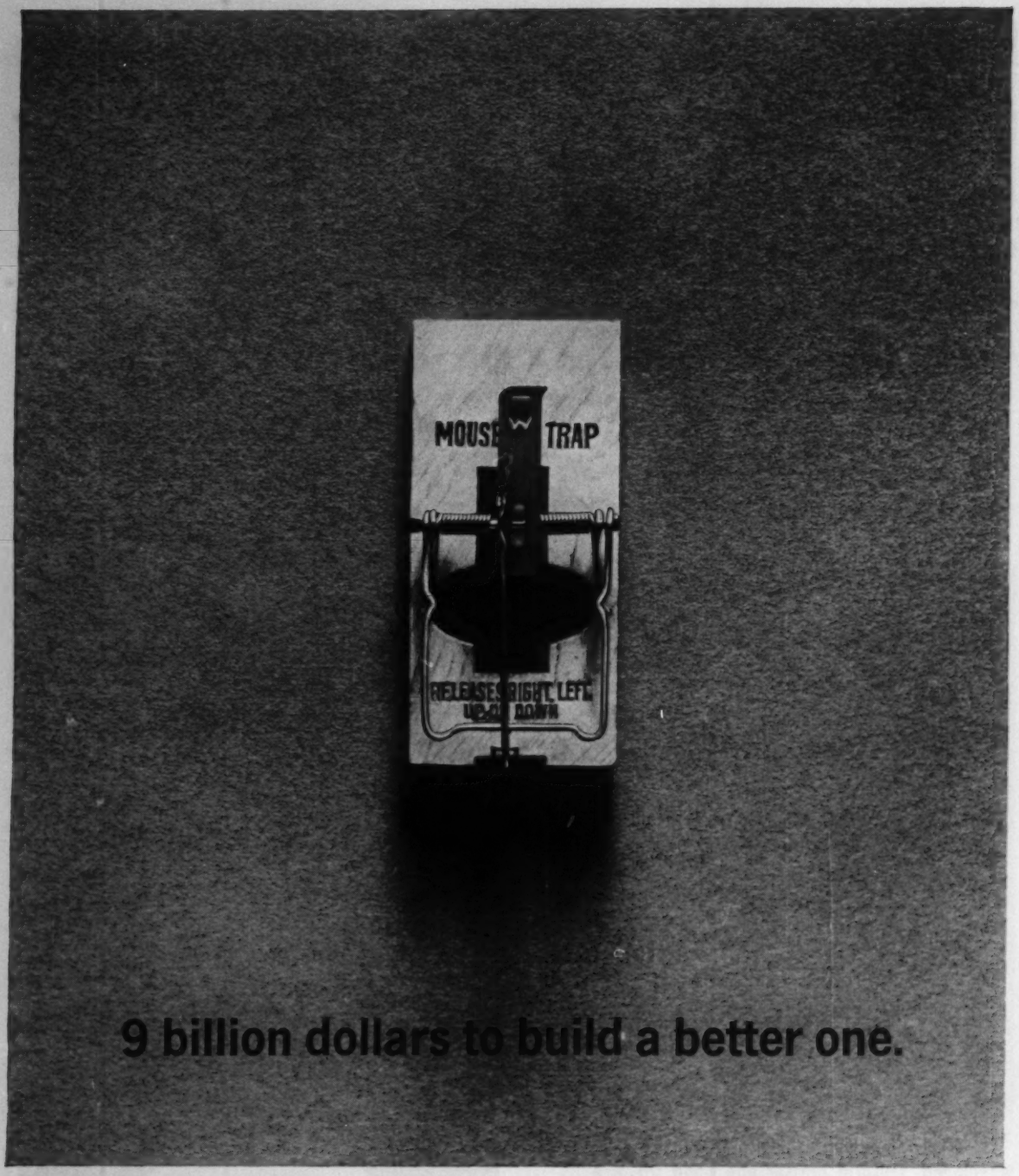

9 billion dollars to build a better one.

We're living in a needing, buying, growing America—a time for new and improved products and services—the creation of new jobs. More than ever, a businessman with an idea, with the urge for something better will move ahead with our expanding economy.

But after the idea, what follows can be a costly period of research and development. Not necessarily—if you use the immense 9-billion-dollar fund of research and patent information that's available at your U.S. Department of Commerce. Think of the saving—in time and money.

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Take advantage of the many ways in which your business can grow. In developing new products and services. In the lucrative foreign markets. In new U.S. markets. In attracting new industry to your local community. Just phone or write the U.S. Department of Commerce Office of Field Services in your city, or Washington 25, D.C. Your U.S. Department of Commerce is always ready to help you grow with America!

NOW'S THE TIME TO GET GROWING IN A GROWING AMERICA!

USE THESE IDEAS...

TO GET UP TO AN EXTRA 4% NET PROFIT

Out of the Texaco man's briefcase comes a wealth of ideas for cost control through organized lubrication—Texaco's "Stop Loss" Program. Managers in many industries are already using these plans to reduce losses in three important areas: production, maintenance and purchasing. Their savings go directly into profits—the average is a 4% gain in their net. Get the facts. Write for our informative folder: "How to Starve a Scrap Pile." **TEXACO** INC., 135 East 42nd Street, New York 17, N. Y. Dept. S-190

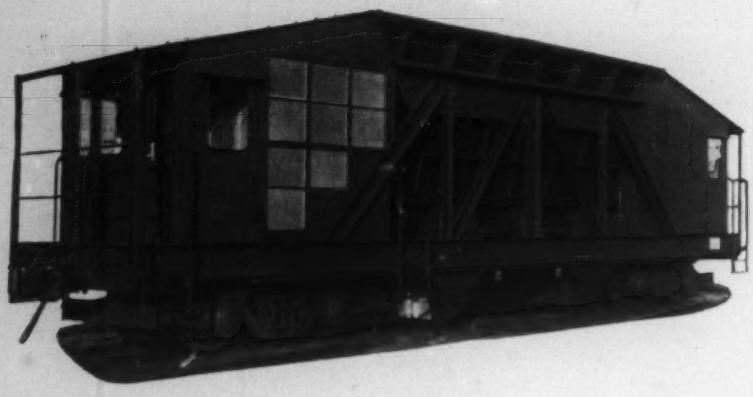
TEXACO

. . . custom built

ATLAS

diesel-electric

ORE-TRANSFERS



75-ton diesel-electric transfer, single hopper, bottom dump with air-operated discharge gates and double-end control.

Atlas builds steel plant cars to fit the exacting needs of each user. And each is constructed with the simplicity and ruggedness that defies obsolescence.

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Producers of Scale Cars, Ore-Transfers, Coal Larries, Door Machines, Coke Quenchers . . .

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CALENDAR OF MEETINGS

Sept. 10-12, Steel Service Center Institute: Great Lakes regional meeting, Greenbrier Hotel, White Sulphur Springs, W. Va. Institute's address: 540 Terminal Tower, Cleveland 13, Ohio. Executive vice president: Robert G. Welch.

Sept. 11-12, American Supply & Machinery Manufacturers' Association Inc.: First Industrial Distribution Conference, Statler Hilton Hotel, Cleveland. Association's address: 2130 Keith Bldg., Cleveland 15, Ohio.

Sept. 11-13, American Mining Congress: 1961 mining convention, Hotel Olympic Seattle. Address: 1102 Ring Bldg., Washington 6, D. C. Executive vice president: Julian D. Conover.

Sept. 11-15, Instrument Society of America: Annual Instrument-Automation Show, Memorial Sports Arena, Los Angeles. Society's address: 313 Sixth Ave., Pittsburgh 22, Pa. Executive director: William H. Kushnick.

Sept. 14-16, Packaging Machinery Manufacturers Institute: Annual meeting, The Homestead, Hot Springs, Va. Institute's address: 60 E. 42nd St., New York 17, N. Y. Executive director: Russell L. Sears.

Sept. 17-21, Non-Ferrous Founders' Society: Annual meeting, Shawnee Inn, Shawnee-on-Delaware, Pa. Society's address: 1604 Chicago Ave., Evanston, Ill. Executive secretary: Herbert F. Scobie.

Sept. 18-20, Standards Engineers Society Inc.: Annual meeting, Hotel Sherman, Chicago. Society's address: Box 281, Camden 1, N. J.

Sept. 19, Electric Overhead Crane Institute, Inc.: Meeting at Palmer House, Chicago. Institute's address: 1 Thomas Circle, Washington 5, D. C.

Sept. 24-26, Steel Founders' Society of America: Fall meeting, The Homestead, Hot Springs, Va. Society's address: 606 Terminal Tower, Cleveland 13, Ohio. Executive vice president: F. Kermit Donaldson.

Sept. 24-28, Pressed Metal Institute: Annual meeting, Grand Hotel, Point Clear, Ala. Institute's address: 3673 Lee Rd., Cleveland, Ohio. Managing director: J. D. Keith.

Sept. 25-28, Association of Iron & Steel Engineers: Annual convention, Penn-Sheraton Hotel, Pittsburgh. Association's address: 1010 Empire Bldg., Pittsburgh 22, Pa. Managing director: T. J. Ess.

hoover quality bearings

. . . HARDLY A WHISPER

Nuclear submarines like the SKIPJACK are designed to carry out underwater missions in utmost silence. That is why the hushed quietness of *Hoover Quality* ball bearings makes them ideal for critical applications on this and many other types of equipment.

Hushed quietness in a bearing is a promise of excellent quality, superior performance and long life.

And it's no coincidence that Hoover bearings are exceptionally quiet. *Hoover Honed* bearing raceways are super smooth, superbly finished. *Micro-Velvet* balls are spherically accurate within millionths of an inch and surface finished to microscopic perfection. These precision components work together in perfect harmony. We, at Hoover, know because every *Hoover Quality* bearing is checked electronically before it is shipped.

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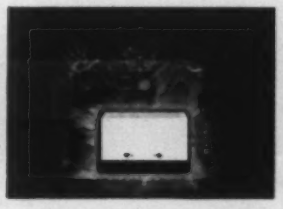
hoover CONTROLS *hoover quality* FROM START TO FINISH

High quality wire from which balls are made is produced by Hoover's Cuyahoga Steel and Wire Division.

Hoover *Micro-Velvet* Balls are made of the finest of chrome alloy steel. Sphericity is measured in millionths of an inch.

It's easier to strike a match on plate glass than on the smooth finish of a *Hoover Honed* bearing raceway.



Hoover quality control methods include non-destructive electronic inspection of bearing components.

WIN THIS CONTEST! *

* **Imagine you're John! Write your answer to this question in the contest entry blank above, with your name and address or on your company's letterhead and mail to AMWELD. For your interest, you'll receive a FREE set of Chinese Linking Rings (favorite trick of magicians for centuries, and one sure to delight your family and friends). We'll be happy to award a dozen Titleist Golf Balls for the best answers received! Here are a few hints:**

Name_____

Title_____

Company_____

Address_____

City_____ State_____

Amweld flash butt-welded rings reduce input material — save machining time. The basic process of developing a ring on a 3-roll former or bending arc-by-arc under dies is less complicated and costs less than other methods. Unnecessary metal is eliminated in the fabrication of your rings because flash butt-welding permits the use of closely toleranced mill bar stock which is close to your finished dimensions, meaning you have less material to machine away!

In Amweld flash butt-welded rings, the weld is as strong as the parent metal itself! Tensile tests conducted on thousands of rings prove conclusively that in most cases the weld area is at least 97% as strong as the parent metal. And in many cases, the weld strength exceeds that of the rest of the ring! Flash butt-welding produces a forged joint—no filler material is added, thus the weld area is composed entirely of parent metal.

Extruded and mill-rolled sections can save up to 70% of material costs! Flash butt-welded rings fabricated from extruded and mill-rolled shapes that approximate the contour of the cross section of your finished part can offer substantial savings when quantities permit. These savings are further reflected in the elimination of many costly machining hours.

Amweld saved its customers over a million dollars last year! Amweld flash butt-welded rings may now be giving other companies in your field a competitive advantage! Today, many manufacturers are getting greater product profits through continued use of Amweld rings in such industries as construction equipment, motors and generators, fabricated metal plate work, mechanical power transmission, transportation and materials handling, and many others. You can't afford not to investigate Amweld!

P.S. For further help in writing John's answer, send for the new Amweld products catalog. Or if you have something more specific in mind, don't hesitate to send your specifications, a blueprint, or a sketch, so Amweld can quote for your cost evaluation!

AMWELD®
INDUSTRIAL PRODUCTS

The American Welding & Manufacturing Co.
806 Dietz Road, Warren, Ohio

Auto Inventories Plunge as Planned

The auto industry's carefully planned cleanup of 1961 models appears to be running on schedule. Only 44,000 cars were shipped to dealers Aug. 1 to 10 but dealers sold more than 140,000, says *Ward's Automotive Reports*. The August trend should send inventories of 1961 and 1962 models to a 19 month low of 655,000 by the end of the month.

Mills Carry Inventory Burden, Says Hanley

E. J. Hanley, president, Allegheny Ludlum Steel Corp., says his company is carrying the largest stocks of finished and semifinished products of any time in its history. Since competition centers heavily on rapid delivery and there is no threat of steel shortages, customers have cut their inventories and depend on the mills to carry larger stocks. On prices, he says: "There should be compensating adjustments . . . it would take a venturesome, perhaps foolhardy, soothsayer to predict the outlook."

Soviets Promise Industrial Aid to Ceylon

The first steel plant in Colombo, Ceylon, will be set up in 1963-64, say Soviet sources. Capacity: 35,000 tons annually. Russia will train 110 Ceylonese engineers in the Soviet Union and some at the Indian Bhilai steel plant which was built under Soviet supervision. Other Red aid to Ceylon includes plans for setting up a rubber tube plant near Colombo.

Cryogenic Stretching Boosts Strength, Cuts Cost

A cryogenic metalworking process developed by Arde-Portland Inc., Paramus, N. J., produces steel vessels with tensile strengths of 260,000 psi, saving weight and cost. A cylinder of 301 stainless is rolled, welded, and placed in a tank of liquid nitrogen. When it cools to −320° F, the liquid is removed and the cylinder itself is filled with gaseous nitrogen to cause a 13 per cent stretching. The photo at left shows a missile fuel case being removed from the forming tank.

Analysts Pessimistic on Steel's Growth Potential

The steel industry's growth potential for the next five years looks poor on the basis of Opinion Research Corp.'s survey of 671 security analysts. Reasons for the pessimism: Excess capacity; competition from overseas and

at home from aluminum, plastics, and cement; excessive labor costs. Only 2 per cent of the analysts regard the industry's growth potential as attractive compared with 14 per cent in a 1958-59 study. In the long term, however, new uses of steel, product innovation, and increased automation will contribute to the industry's growth.

Beryllium Sheets Near Big Markets

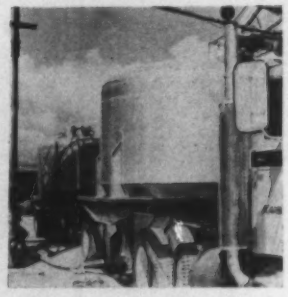
Brush Beryllium Co., Cleveland, has a new $255,000 Air Force contract to improve production techniques for beryllium sheets. Objectives: Better bendability, improved surface finish, better uniformity of thickness. Used in missile structures, like that at left, beryllium could "profoundly increase their range and performance characteristics," claim officials. They expect beryllium sheets to be used in "substantial tonnages" in aircraft and space applications within 16 months.

How AC Spark Plug Machines Beryllium

Machining beryllium leads to many problems. Special knowhow in speeds, feeds, and setup is required. There is also the problem of safety and health due to the chips and toxic dust produced. The story beginning on Page 70 describes some of the unusual steps AC Spark Plug has taken in working with the metal.

Air Pressure Speeds Unloading

Twin tank, transport trailers built at Heil Co.'s Modesto, Calif., plant unload bulk materials by blowing them out. Upon arriving at the destination, air in the tanks is compressed to 25 psi. That provides the force to discharge bulk cargo at speeds up to 3500 lb per minute into customer storage tanks.



Here's Listing of Radioisotope Lifetimes

"Half life" is the length of time it takes a radioisotope to lose one-half its strength. Union Carbide Corp. gives these "half-lives" for common isotopes:

Indium-114 ....72 seconds	Chromium-51 . ..27.8 days	Krypton-85 ....10.27 years
Copper-64 ... .12.8 hours	Iron-59 .....45.1 days	Strontium-90 .....28 years
Palladium-109 ..13.6 hours	Tin-113 .....115 days	Cesium-137 .....30 years
Cadmium-115 ....53 hours	Calcium-45 .....164 days	Carbon-14 ....60 centuries
Gold-198 .....65 hours	Cerium-144 .....290 days	Technetium-99
Iodine-131 .....8.08 days	Promethium-147 ..2.6 years	.....2100 centuries
Barium-131 .....11.6 days	Cobalt-60 .....5.27 years	

Compiling System Cuts EDP Programing Effort

Minneapolis-Honeywell Regulator Co.'s Electronic Data Processing Div. has completed a compiling system which simplifies and speeds programing for

the Honeywell 800 computer. The automatic coding system accepts instructions written in ordinary mathematical statements and the computer translates them into its own detailed language.

Demand for Fluid Power Systems Climbs

Production of fluid power systems equipment may reach $600 million this year, up 15 per cent from 1957, the Commerce Department estimates. Demand from industrial, aircraft, marine, ordnance, and other markets is on the increase. C. C. Sigmier, chairman, Parker-Hannifin Corp., Cleveland producer of fluid systems equipment, says the long range outlook for the industry is excellent. He forecasts a 50 per cent increase in his company's annual sales by 1966.

Typical Costs of Building Missiles

Expenditures for electronics (guidance and control) rank high in relation to other missile production cost, as shown by these Stanford Research Institute figures:

Type	Surface-to-Surface	Surface-to-Air	Air-to-Air
Total Cost	$1 million to $2 million	$50,000	$15,000
Guidance & Control	40%	52%	72%
Airframe	30%	25%	12%
Propulsion	20%	20%	7%
Miscellaneous	10%	3%	9%

Tiny Transistor Is 800-in-One

This tiny, three legged silicon transistor, mass produced by Radio Corp. of America, is a step toward a "universal" transistor. RCA says this model can take the place of about 800 of the 2000 different types. It can be used in a wide variety of military and industrial devices.

SBA Loan Approvals Hit Peak in June

The Small Business Administration approved a record 921 loans during June for a total of $48,255,000 vs. 539 loans for $25,588,000 in June, 1960. During the first six months of this year, SBA approved 3068 loans for $154,170,000, a substantial increase over the $98,887,000 for the first half of 1960.

Sonar Replaces Cable in Underseas Communication

A cableless, underwater communication system has been introduced by Bendix-Pacific Div., Bendix Corp. Existing telemetry and sonar equipment are combined to send messages up to 5 miles with as many as ten continuous

STEEL The Metalworking Weekly

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subcarrier channels. Possible applications: Transmission of oceanography research, undersea medical studies, weapons research, exploration for oil, and remote control of torpedoes and vessels.

Scientist-Engineer Pinch Tightens

In mid-June, 92 per cent of all graduating engineers were committed to jobs, advanced education, military service, or other specific plans. Military and space races with Russia plus industry's search for profits through science have created a skyrocketing demand for scientific personnel. That's why it's getting harder not only to recruit engineers and scientists but to hold on to the ones you already have. See Page 42.

NAA Shows Portable Power Supply

The young lady in the photo is demonstrating a portable, thermionic generator developed by Atomics International Div., North American Aviation Inc. The fuel supply is propane gas. Heat generated is converted directly (no moving parts) to electricity. The thermionic converter is made up of two metal plates. One is heated to 2800° F, causing electrons to boil off and jump the small gap to the cooler electrode, producing an electric current. The firm visualizes combining such a converter with a conventional turbine-generator system in power stations of the future.

Straws in the Wind

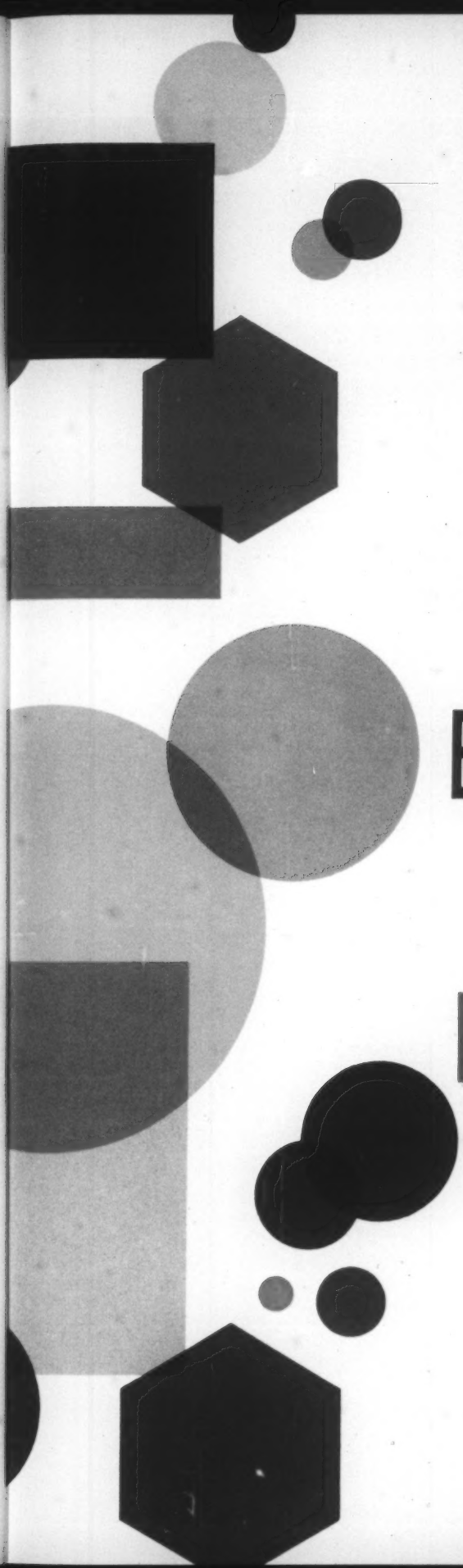
Dun & Bradstreet Inc. reports business failures fell to a ten-month low in July but both the number of failures and total liabilities were the highest for any postwar July . . . The 10,644 backlog of freight car orders Aug. 1 was less than the July 1 backlog and far short of the 26,658 a year ago . . . Home building activity in July declined 5 per cent from that in June on a seasonally adjusted basis . . . A $3 million Inter-American Development Bank loan will enable the Small & Medium Guarantee & Development Fund of Mexico to extend credit to more industries for purchasing capital goods . . . The Resistance Welder Manufacturers' Association reports 1961 sales are closing in on last year's level—they're now off only 6 per cent.

Metalworking Pulse

The Business Trend: During the week ended Aug. 19, STEEL's industrial production index slipped another point to a preliminary 157. A further rise in steel production failed to make up for the low point in automotive because of model changeover. **Autos:** Last week, all makers were in some stage of 1962 model production. Output will improve steadily well into the fourth quarter. **Steel:** Ingot output has risen four weeks in a row. Look for still higher levels in September.

- **INDUSTRIAL PRODUCTION INDEX**
  (1947-49 = 100)
  Week ended Aug. 19 . . . **157†**
  Year ago **145**
  Details on Page 59
- **PASSENGER CAR OUTPUT (UNITS)**
  Week ended Aug. 26 . . **30,000***
  Year ago **38,952**
  Details on Page 56
- **STEEL INGOT OUTPUT (TONS)**
  Week ended Aug. 26 **1,980,000***
  Week ago **1,944,000**
  Details on Page 103

†Preliminary. *Estimated.



New
Allegheny Stainless
Bar Program
Means . . .

FAST DELIVERY

BETTER MACHINABILITY

UNIFORM IMPROVED PROPERTIES

TOP QUALITY PROCESSING

FAST DELIVERY—

5,000,000 lbs. of finished bars
8,000,000 lbs. of semi-finished stocks
to back-up distributor inventory

Allegheny Ludlum now stocks at the mill depots, Rounds, Hexagons, Squares, Flats and Forging Billets in the ten most popular grades that account for over 85 percent of all stainless bars made. This huge stock of over 2,500 tons backs up the large inventories carried by the authorized Allegheny Ludlum Distributors.

In addition to the finished stock, over 4,000 tons of quality checked rerolling billets and ingots in 30 grades are in inventory to cut delivery time and to insure predictability.

Each month, A-L publishes a Bar, Wire, and Forging Billet Stock List which lists the grades, sizes, and actual pounds of each in stock at the first of that month. It's available to you through the Steel Service Centers authorized to sell A-L Stainless Bars. For the names of the distributors in your area, just call the A-L District Office.

BETTER MACHINABILITY—

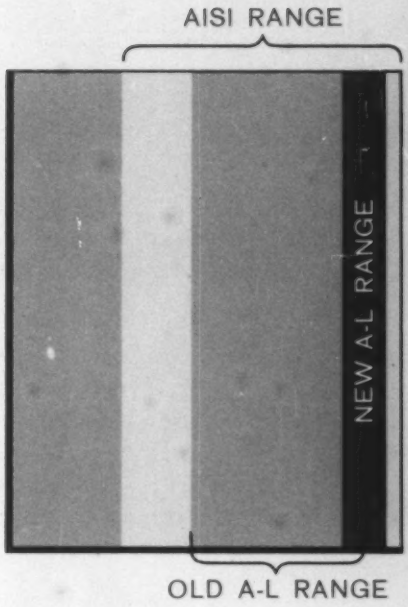
Research, Constant Testing and Controlled Processing Result in Greatly Improved Machinability and Uniformity . . . from Lot to Lot

Several years ago, A-L took a hard look at its own stainless steel bars. While quality was good, it could be made better and more uniform, particularly in the area of machinability.

One of the finest metalcutting laboratories in the country was retained to make independent, exhaustive comparative tests on A-L stainless bars and competitive bars. Ratings were based on tool life, determined by turning and drilling tests. A-L's Research Center, probably the largest in the stainless business, correlated these results with metallurgical factors such as composition, microstructural and mechanical properties.

From Research to the melt shops went instructions to revise and narrow the limits of composition. This, combined with processing changes, yields general purpose (stocked) grades with predictable, better machinability.

RESULT: Testing general purpose machining grades as made three years ago with the same grades made today shows better than a 50 percent increase.



ANALYSIS LIMITS

Allegheny Stainless composition limits, already much tighter than AISI Specifications, have been narrowed even further to improve the composition-sensitive machining properties of all A-L Stainless Grades.

MACHINING TESTS

Exhaustive turning and drilling tests on stainless bars of all types pin-pointed the composition and processing variables that most affected machining properties, and made possible the adjustment of these variables for improved machinability and predictability of response from heat to heat. A continuing program of these machining trials serves as an additional safeguard to the quality and unmatched dependability of an A-L Stainless Bar.

TOP QUALITY PROCESSING—

Special Care and Special Equipment Mean Better Bars at Your Machines

What's been your big trouble with cold finished stainless steel bars . . . nicks and gouges, off-size, burred ends, grinding marks, damaged shipments? Glance over the panels at the right, and see how these common faults are eliminated from Allegheny Ludlum cold finished stainless bars.

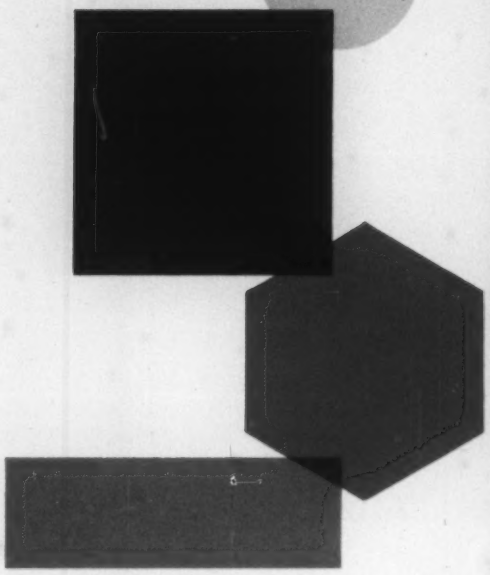
These are precautions that make a difference between an A-L quality bar and all the others . . . quality you can see, and feel, and measure. Quality that shows up in bar automatics, in all your fabricating.

And this quality is no accident. A few years ago, Allegheny Ludlum investigated stainless bars from the customer's viewpoint. A-L teams held field interviews, toured customer's plants, watched stainless bars undergoing every conceivable fabricating operation. A good part of the trouble was in mill finishing. And A-L revamped their entire finishing operation to suit.

Special equipment is installed, and every operation becomes a matter of painstaking care. Rubber padding covers every work table and inspection table, lines every transfer buggy . . . chain and cable slings are eliminated, and soft rope substituted . . . cardboard collars are fitted to bars in process, to prevent rubbing and scratching.

Quality Audit Teams continually audit and maintain quality control standards by making pinpoint quality checks through every phase of production . . . right onto the shipping dock.

Many of these practices have been widely imitated in the industry. Some are still A-L exclusives. But, this is how quality is made . . . stainless steel bar quality . . . by the world's leading stainless steel producer.

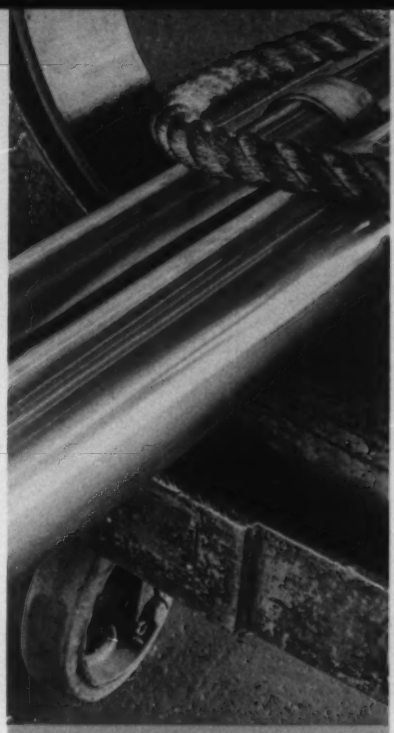


HEAT NUMBERS ON EVERY BAR

Heat numbers stamped permanently on one end of the bar won't wear off, can't get separated. Square, clean-cut and deburred ends make use in bar automatics easier and make chucking simpler.

CONSISTENT SIZE AND STRAIGHTNESS TOLERANCES

A-L's famous quality control and inspection procedures mean greater uniformity . . . minimizes special handling in your plant.



NICK-FREE, SCRATCH-FREE BARS

Nothing harder than cardboard, ropes or rubber ever touches finished A-L bars. Cardboard collars eliminate sliding, metal-to-metal contact . . . chain or cable are never used.

SMOOTHEST FINISH AVAILABLE

Consistent metal quality and careful finishing result in a surface vastly superior to the industry-accepted average standard.

CAREFUL FINISHING PAYOFF

Multiple passes through centerless grinders result in smooth finish—no spiral grind marks —no chatter marks.

PROTECTED SHIPMENTS

All bars are protected with cardboard collars and then the bundle is completely wrapped with triple-thickness waterproof paper to protect the superior finish during shipment. Reduces damage in transit.

And if You Want Something Special A-L is a Complete Bar Source

HIGH TEMPERATURE STEELS & ALLOYS

A-L stocks certain finished bars in the most commonly used high temperature steels and alloys plus a large stock of approved billets in these same grades. Needs for bars of A-286, 19-9DL, AM-355, Waspaloy, AL 901, R 41, S-816, M-252, etc., are usually quickly satisfied from this finished and semi-finished stock of Allegheny Ludlum.

FORGING BARS & BILLETS

Also in stock is a full range of forging-quality bars and forging billets from 4 to 30 inches Round Cornered Squares in a wide range of grades, all meeting appropriate specifications.

SPECIAL ANALYSIS AND PROCESSING

For special requirements, A-L is able to tailor-make properties to fit the end use. From knowledge gained in the machining research program, chemistry and processing can be varied to increase a specific property for a particular application. Improvements in such things as hot workability, cold workability, hardenability, finish after machining, improved machinability in non-free machining steels, mechanical properties, corrosion resistance, are examples.

It's something you should discuss with your A-L sales representative.

MACHINING AND HEAT TREATMENT DATA

A-L mill and research specialists are available, through the A-L sales representatives, for help and counsel on problems involving Allegheny Stainless Bars. Qualified machining engineers are at your service. These men devote their full time to provide the best service and assistance available anywhere.

NEW BAR BOOKLET

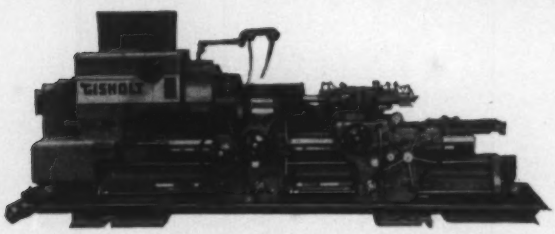
On the printing press now is A-L's new booklet, jam-packed with helpful information on using, heat treating and machining Stainless Bars. For a copy of this technical, data-filled booklet, check the A-L authorized distributor in your area, or the A-L Sales Office nearest you, or write: ***Allegheny Ludlum Steel Corporation, Department QIP 3, Oliver Building, Pittsburgh 22, Pa.***

ALLEGHENY LUDLUM

EVERY FORM OF STAINLESS . . . . EVERY HELP IN USING IT

3473

SOMEBODY
is doing it for
LESS



MASTERLINE® 3L Saddle Type Turret Lathe—
Offers maximum operator ease: speed selector for 12 or 24 spindle speeds; separate lever controls for cross and longitudinal rapid traverse. With cross-feeding hex turret, standard tools handle all types of machining. JETracer® (for cross slide, cross-feeding hex turret, or mounted on turret face) handles tapers, contours, steps and combination forms automatically.

Call your Gisholt Representative or write for literature.

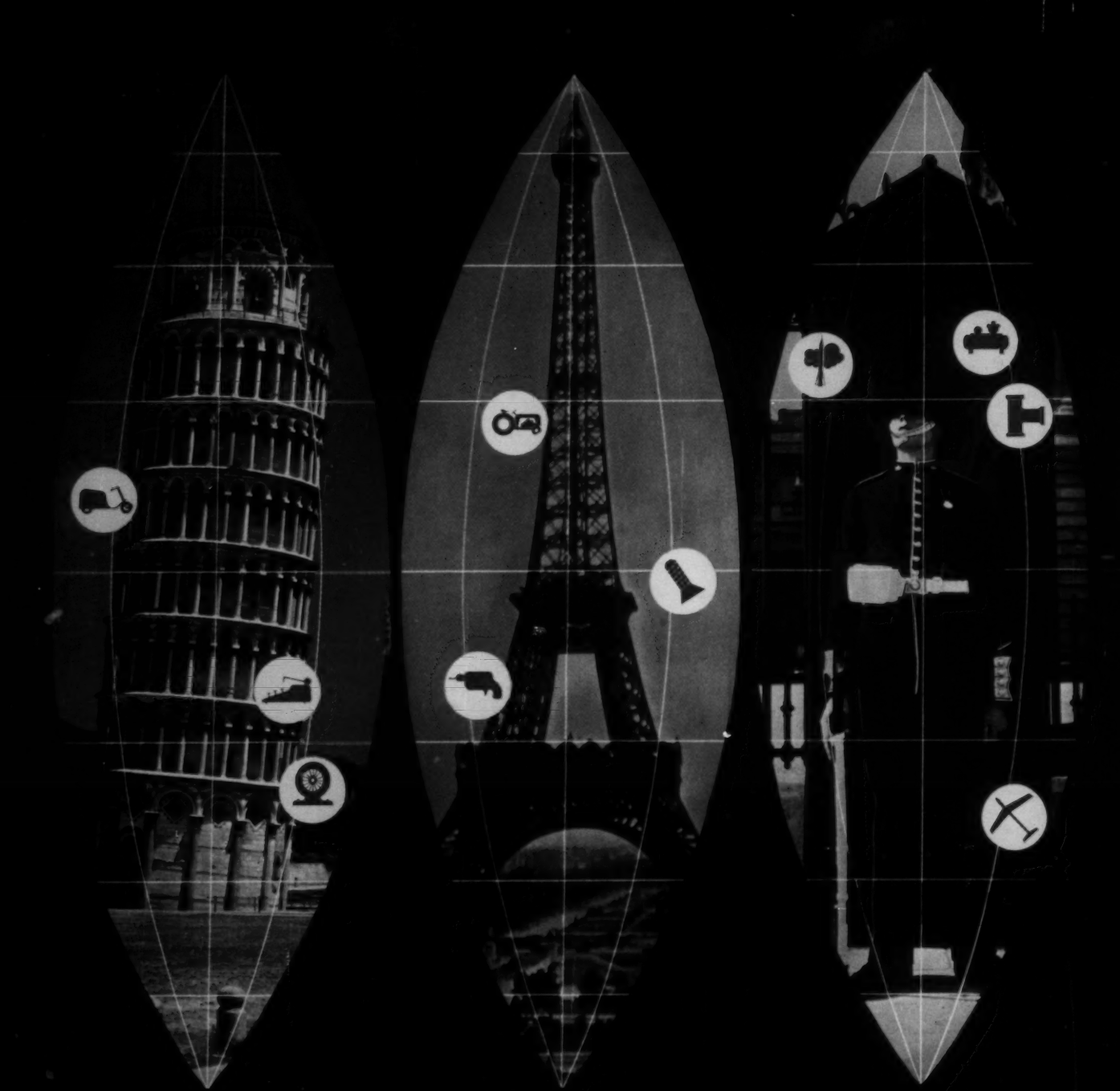
And since that somebody competes directly with you, it's time to act. With modern lathes, sooner or later he'll force your hand.

Do you realize that a new Gisholt Turret Lathe is at least 40% more efficient than a 10-year-old machine? You save time and floor space—you reduce rejects, maintenance costs, and skilled labor requirements.

Why not act now? Find out what a new Gisholt can do for you. Join those who are doing it for less.

Write for Literature.

GISHOLT
MACHINE COMPANY
Madison 10, Wisconsin, U.S.A.

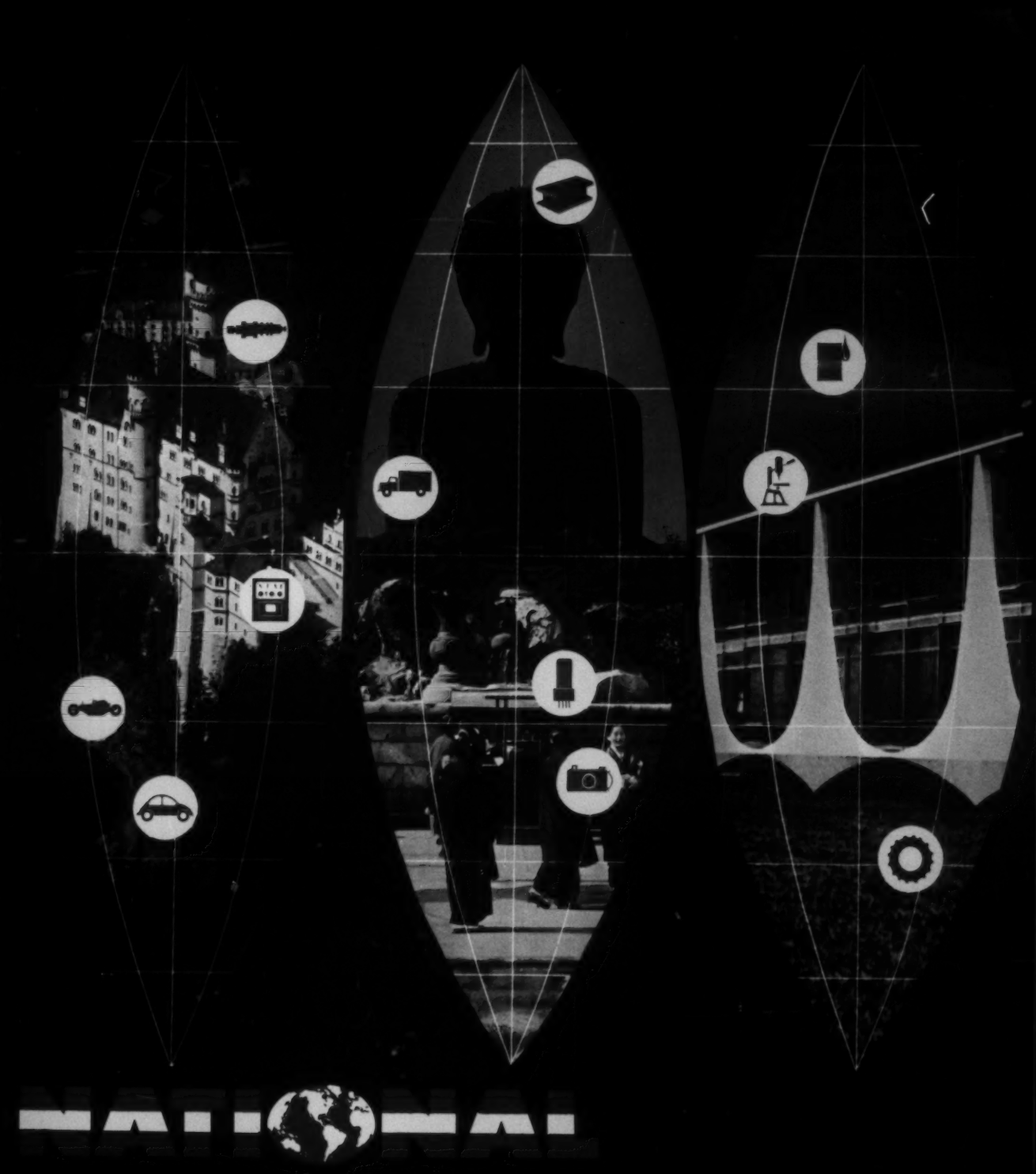


STEEL

STEEL INTERNATIONAL will be published monthly ... distributed to leading metalworking companies in Western Europe, Japan, Australia, India, Africa, Central and South America.

Format of the new publication will be similar to STEEL but will accent news and technical information of specific interest to overseas metalworking managers in administration, production, purchasing and engineering.

Over the years Penton has spent millions of dollars on keeping an up-to-date, comprehensive census of U.S. metalworking plants. Now this same precise yardstick will be used by STEEL to assure coverage of the right

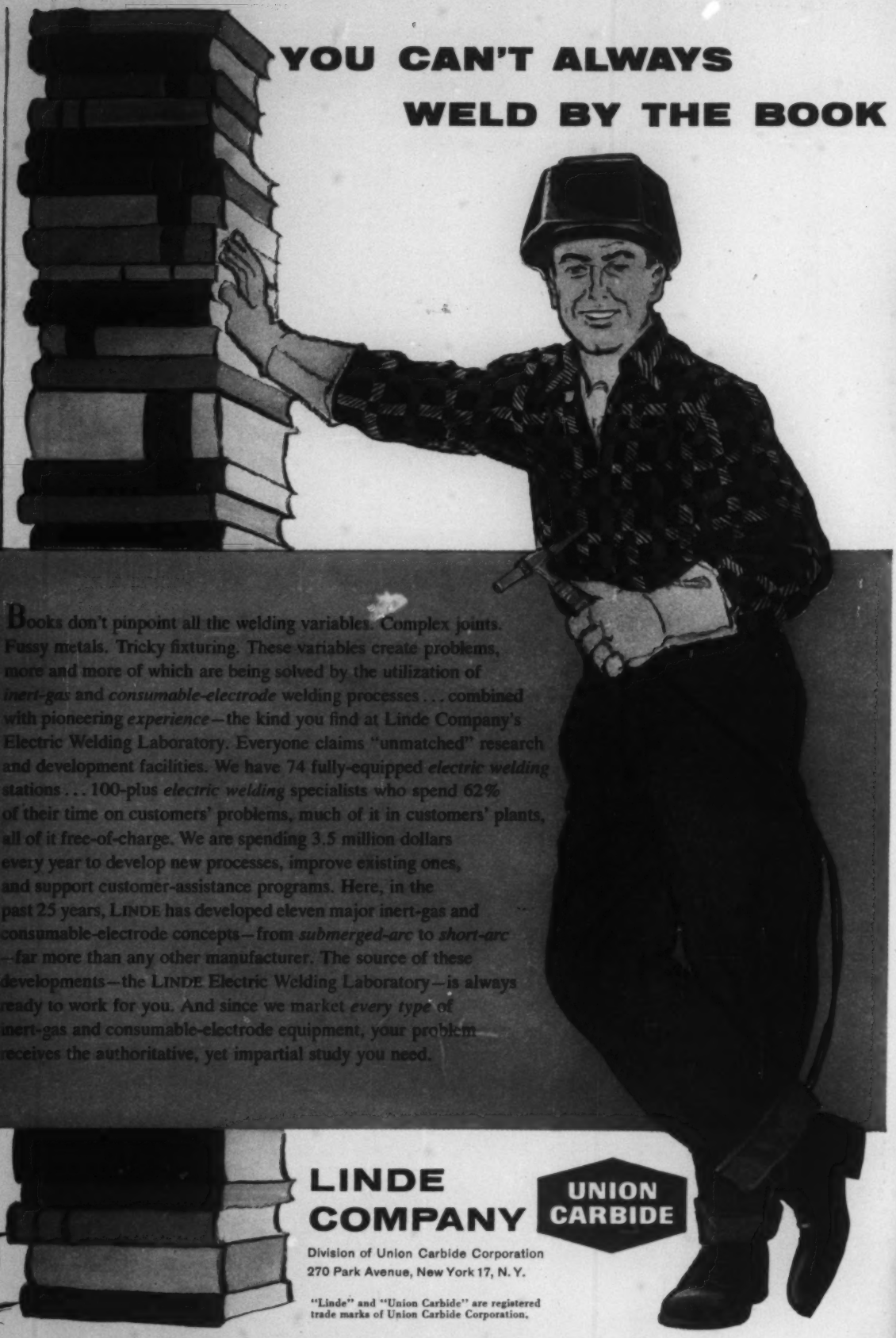


NATIONAL

people in the most worthwhile overseas plants.

For the first time you can buy advertising in a metalworking publication exclusively designed to meet your overseas marketing requirements. You can plan your strategy and sales support efforts with utmost flexibility . . . economy . . . simplicity. Available are three advertising rate cards including (1) STEEL INTERNATIONAL Edition, (2) STEEL Domestic and Canadian Edition, and (3) Combination of STEEL and STEEL INTERNATIONAL. Your STEEL Representative can give you detailed information.

YOU CAN'T ALWAYS WELD BY THE BOOK



Books don't pinpoint all the welding variables. Complex joints. Fussy metals. Tricky fixturing. These variables create problems, more and more of which are being solved by the utilization of *inert-gas* and *consumable-electrode* welding processes . . . combined with pioneering *experience*—the kind you find at Linde Company's Electric Welding Laboratory. Everyone claims "unmatched" research and development facilities. We have 74 fully-equipped *electric welding* stations . . . 100-plus *electric welding* specialists who spend 62% of their time on customers' problems, much of it in customers' plants, all of it free-of-charge. We are spending 3.5 million dollars every year to develop new processes, improve existing ones, and support customer-assistance programs. Here, in the past 25 years, LINDE has developed eleven major inert-gas and consumable-electrode concepts—from *submerged-arc* to *short-arc* —far more than any other manufacturer. The source of these developments—the LINDE Electric Welding Laboratory—is always ready to work for you. And since we market *every type* of inert-gas and consumable-electrode equipment, your problem receives the authoritative, yet impartial study you need.

LINDE COMPANY

UNION CARBIDE

Division of Union Carbide Corporation
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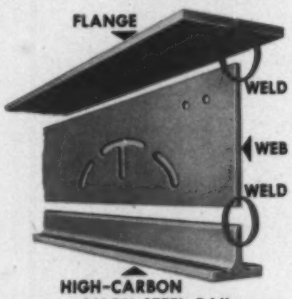
CLEVELAND TRAMRAIL
ANNOUNCES
TARCA
TRACK

A MAJOR TRACK DEVELOPMENT FOR OVERHEAD MATERIALS HANDLING

Continuous automatically—controlled welds

Flange, web and rail joined by continuous automatic welds assure reliability.



Hard, raised, long-life treads

Rail especially rolled of high-carbon alloy steel for maximum durability. Treads are extra hard, raised, flat and smooth—for easy load movement—prevent peening—longer wear.

another exciting "first"

An outstanding advancement in a long series pioneered by Cleveland Tramrail to make it the leader in the overhead materials handling equipment industry. An entirely new track that had to be great to be better—result of years of research.

a far better track

Balanced design with parts proportioned exactly to provide maximum strength with minimum weight. Greater rigidity to withstand severe working conditions.

easier, faster to erect

Straight, true, smooth. All dimensions held to greater accuracy. Tarca Track matches with existing Cleveland Tramrail installations.

large range of sizes

10 standard sizes from 8″ to 20″ deep. Special sizes can be fabricated for unusual applications.

Ask for this helpful booklet—No. 2032

Covers all major features the buyer should know about overhead materials handling equipment. Has complete story on Tarca Track. Contains detailed equipment specifications and handy proposal evaluation form.

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO
5899 EAST 284th STREET · WICKLIFFE, OHIO

Most Installations of Cleveland Tramrail Equipment pay for themselves within one or two years.

Trade–mark of durability and strength —punched into all Tarca Tracks.

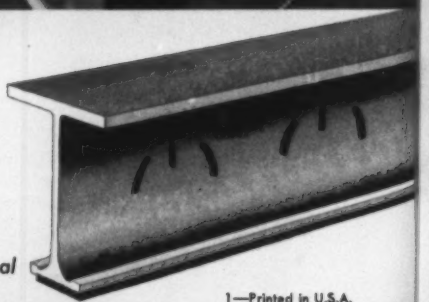
One of the more recent important materials handling developments initiated and engineered by Cleveland Tramrail for the Wire and Rod Industry is the hydraulically-operated grab for storing coils in vertical piles. This device picks up several coils at a time and works in either vertical or horizontal positions.

Simple inexpensive hand-propelled Cleveland Tramrail cranes are filling a mighty important need in a vast number of places. For instance, in this warehouse of a glass distributor, heavy awkward cases are handled by one man and piled high, thereby utilizing the storage space to the maximum.

Cleveland Tramrail gantry cranes have long been popular because they increase efficiency of many local handling situations. They will operate under overhead cranes without interference. Tramrail gantries are built in many types and sizes, with manual or electric drives.

Your Cleveland Tramrail Sales Engineer is Qualified to give you the Complete Design and Application Story on This Revolutionary

NEW TARCA TRACK



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EX-CELL-O

Contour Projector Used To Aid Nuclear Research

Engineers for the Enrico Fermi Atomic Power Plant used an Ex-Cell-O Model 30 Contour Projector to determine the maximum load that could be applied to a "dimple"!

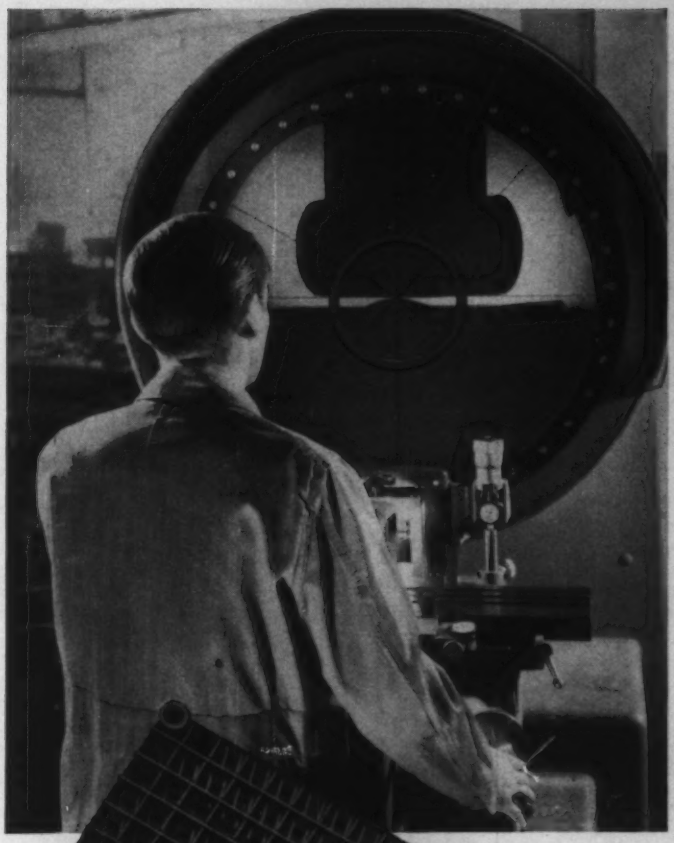
The uranium rods comprising the fuel elements in a reactor core are held vertically in "egg crate" assemblies. Each strip contains precision stamped "dimples" to provide necessary support and accurate alignment.

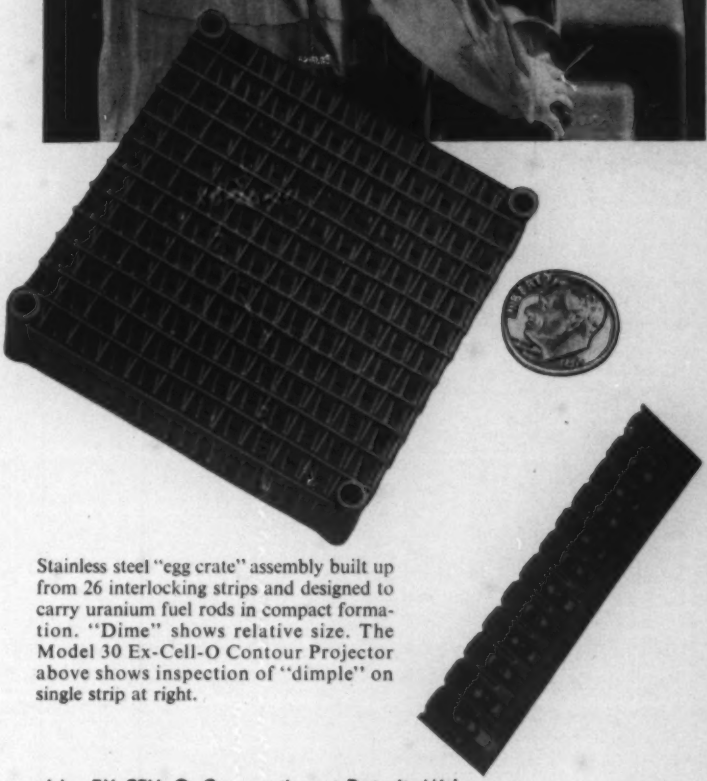
The problem was how to determine the maximum load that could be applied to these "dimples" before permanent set took place.

Simple with an Ex-Cell-O Model 30 Contour Projector! The workpieces were mounted in a holding fixture and stress applied in increments of one pound. Under 100X magnification the deflection in movements of .0001 inch or less was easily seen on the projector screen! With the highly accurate vertical measuring micrometer and dial indicator, standard on the Ex-Cell-O Model 30 Contour Projector, the actual deflection was measured and recorded with great precision! Successive readings were plotted up to and including the yield point.

This is not an unusual inspection application for Ex-Cell-O Contour Projectors. They are helping in hundreds of different ways to speed production and bring about greater accuracy in the fields of electronics, nuclear research, and travel in space!

If you have similar difficult inspection problems . . . if your inspection is taking too much time . . . or if you need greater accuracy . . . an Optical Gaging Products man can help you. We will gladly send you our new booklet "43 Reasons Why Ex-Cell-O Contour Projectors are the First Choice of Industry."





Stainless steel "egg crate" assembly built up from 26 interlocking strips and designed to carry uranium fuel rods in compact formation. "Dime" shows relative size. The Model 30 Ex-Cell-O Contour Projector above shows inspection of "dimple" on single strip at right.

Manufactured by EX-CELL-O Corporation at Detroit, Mich.

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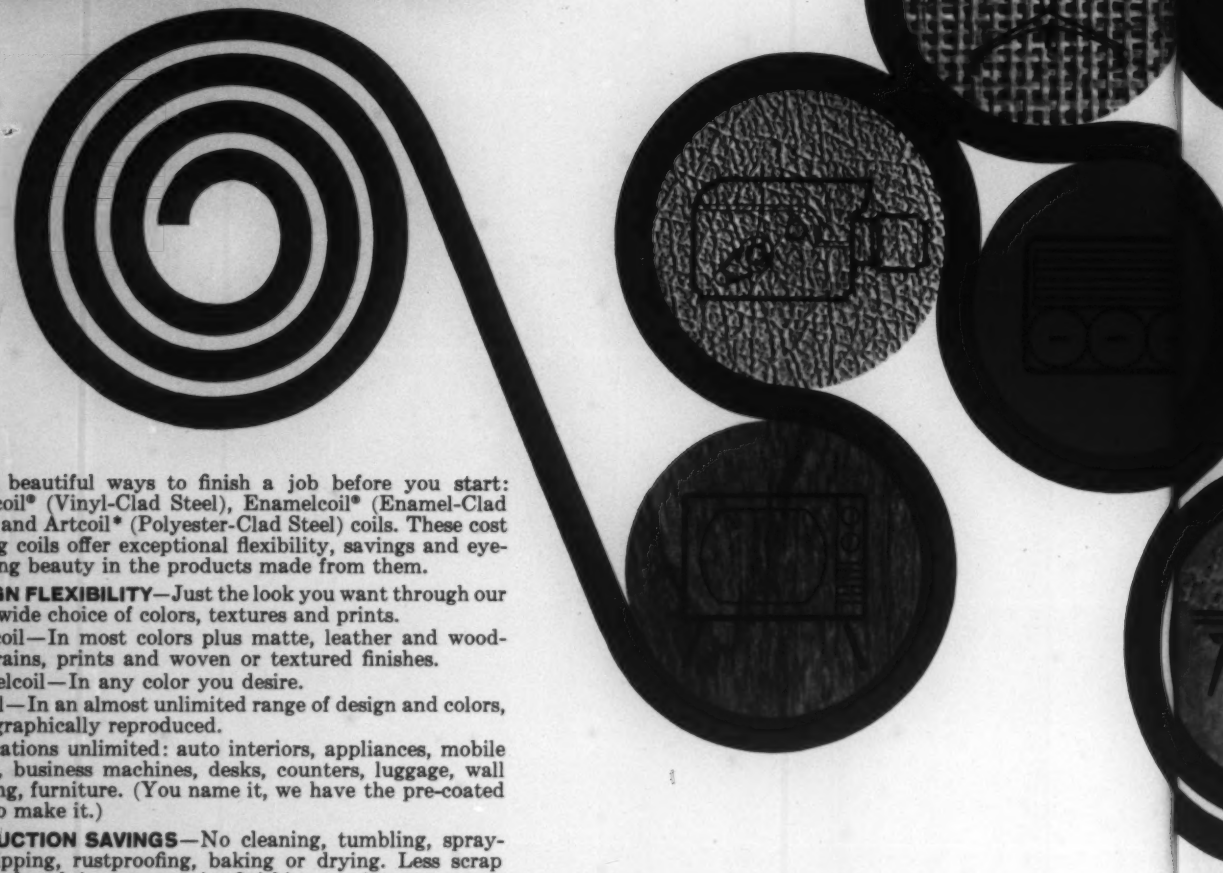

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DESIGN FLEXIBILITY—Just the look you want through our wide, wide choice of colors, textures and prints.

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Enamelcoil—In any color you desire.

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SALES APPEAL—Your product has immediate customer appeal because of its finished beauty, its resistance to scratches, scuff marks, stains and corrosion.

The competitive edge is yours when you start with a beautiful finish. Specify the good looks and long life—the savings and flexibility of these modern pre-coated steel coils from Enamelstrip. Contact your nearest National Steel Sales Office for complete details.

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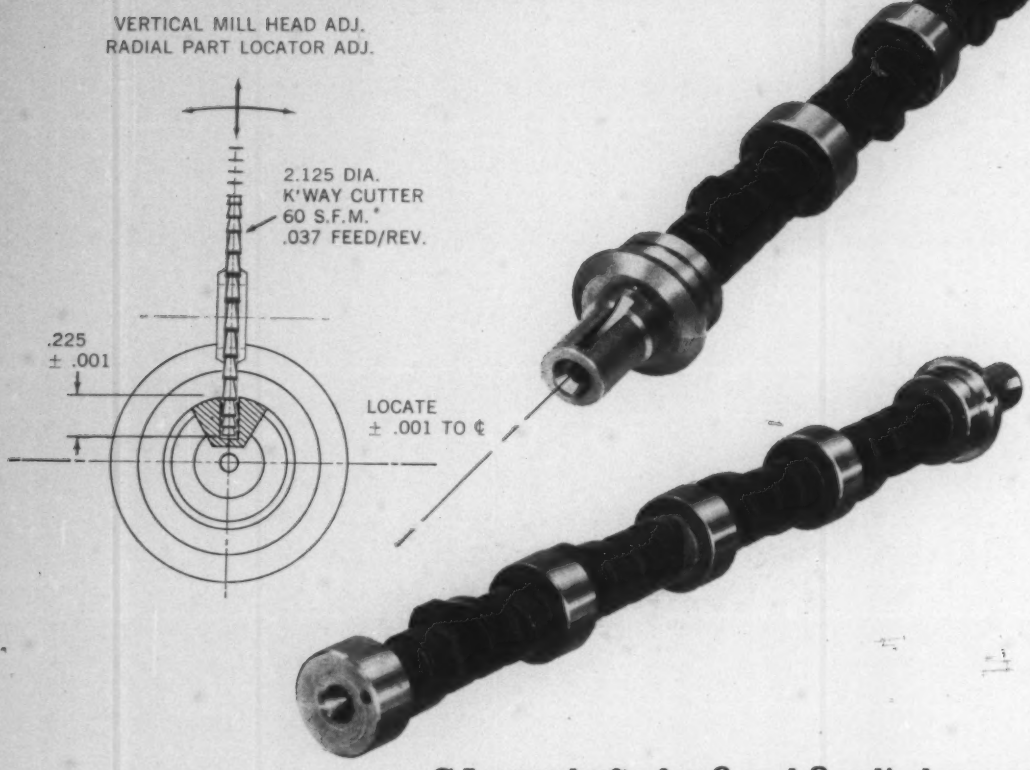
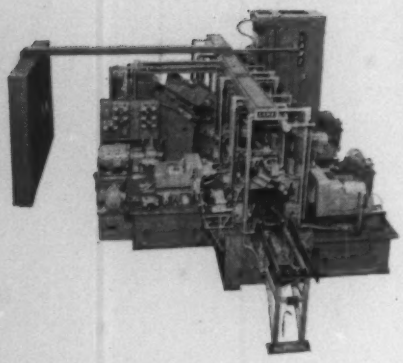


C.I. camshafts for 6 and 8 cylinder engines mill, drill, tap and probe 2 at-a-time.

Mill heads on this 7-station machine are adjustable for precise depth and centrality. Adjustable part locators provide desired radial position for milling the timing gear key slot—the qualifying operation for all subsequent machining. These adjustments will permit future changes in engine timing. Lamb special attention to manufacturing methods will be reflected as quality and economy in your workpiece.



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CENTURY MOTORS PULL HEAT OUT OF 42-STORY BUILDING

Forty-two stories above Dallas, on top of the South's tallest building, three Century 50 horsepower motors are driving induced draft fans to keep the Southland Center cool.

Heat absorbed by air conditioning and refrigeration systems must be returned to the atmosphere as efficiently as possible. Increasing industrial, commercial and domestic water consumption makes it necessary to use systems which recirculate and conserve the cooling water. This cooling tower is part of such a system.

Continuous driving of three huge multi-blade fans is necessary to the operation of this three-cell tower. The Century motors are subject to all sorts of weather—heat, moisture, rain, wind, corrosion. But they keep working—continuously. Century application engineers understand such requirements—call your Century District Office or Authorized Distributor.

CENTURY ELECTRIC COMPANY

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Century

59-23

Here 2100 lb. LPR's reduced downtime frequency by about 86%; slashed scrap loss proportionately; stepped up production 12 to 15%.

Notice how compactly LPR's stock and, in contrast, the sprawling heap of 300 lb. bundles in right background.

How DSC-PORTSMOUTH LPR® COILS cut your handling, fabricating and material costs

HIGHLIGHTS OF LPR EFFICIENCY

LPR's save you money in a dozen ways. Yet, size for size, grade for grade, they cost no more than Brite Wire in short-run bundles.

With LPR's you store your wire in less space, more accessibly; you move more wire in less time; you fabricate more wire per shift at lower man-hour costs; you minimize coil remnant scrap to reduce your material cost per product unit.

WHAT USERS REPORT

Here are excerpts from reports volunteered by Brite Wire fabricators who switched from conventional short-run bundles (150 to 400 lbs.) to LPR's:

Downtime due to coil changes reduced as much as 95% . . . Unloading time alone cut as much as 82% . . . Productivity increased from 20% to 33⅓% . . . Scrap slashed in direct ratio to coil changes avoided (up to 95%) . . . Man-hour costs trimmed 20% and more . . . Storage space reduced by 20% to 50% . . . Inventory management greatly improved . . . Returnable carrier problem and small coil racks eliminated.

Interested in learning more about LPR savings? Just call your nearest DSC Customer "Rep" or write: DETROIT STEEL CORPORATION, BOX 7508, DETROIT 9, MICHIGAN

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Detroit Steel Corporation—General Sales Office, Detroit 9, Michigan
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Business Is People!

So much has been said and written recently about questionable personal deportment and shady business practices that it may be a good time for management to review the need for giving more attention to business ethics.

Few people in business and industry are downright dishonest. Unfortunately, however, too many palpably honest people have adopted multiple standards, and not always by choice.

They apply one set to friends, another to fellow employees, a third to competitors, and a fourth to customers and suppliers.

With those standards, people who would not think of cheating their friends feel no compunction when damning a fellow employee with faint praise to gain personal advantage.

Or, they would readily cut their competitors' throats even if it cost the company its last cent of profit.

Or, they would just as readily succumb to the demands of obnoxious customers for excessive entertainment to "buy" orders.

Examples of such practices are multitudinous.

But their reduction is no simple problem. Neither is it a problem that is insurmountable.

As a basic premise, most people have a deep-seated desire to do the right thing.

But within a company, that desire is stifled by management that swallows "faint praise" or similar tactics, that is indifferent, or that condones questionable or misunderstood policies.

In dealing with other companies, that desire often is thwarted by fear of violating what is assumed to be company policy, or what a competitor might do.

With so many pressures for unethical practices, we think it is up to management to encourage the upgrading of personal and business conduct.

The climate in which people work and do business with each other is created at the top.

After all, business is nothing more than people!

Irwin H. Such

VICE PRESIDENT-EDITORIAL

You don't have to be in trouble to get help from the House of Stainless

Our stainless steel specialists and metallurgists are always ready to help you . . . on the simplest little things or the most complicated technical questions. This goes for anyone . . . whether you are a customer or not, whether you are now using stainless steel, or whether you are considering adapting it to your production.

Perhaps you merely want confirmation on your choice of stainless material. Maybe you need help in obtaining some special grade. You may want suggestions on fabricating methods. Or you may wish to explore possible avenues of cutting costs. No matter what, you'll find the answer you want in this all-out service. It's our philosophy of doing business and we hope you will take advantage of it.

Just phone LAfayette 3-7210 for metallurgical service, for prompt deliveries from warehouse stocks or for mill shipments through our mill placement department.

STEEL SERVICE CENTER INSTITUTE

The House of Stainless

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CHICAGO STEEL SERVICE COMPANY

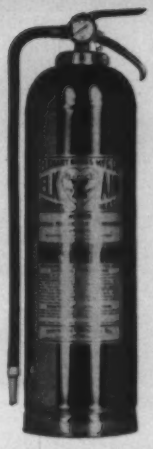
Kildare Avenue at 45th Street, Chicago 32, Illinois; Mailing Address: Box 6308, Chicago 80, Illinois

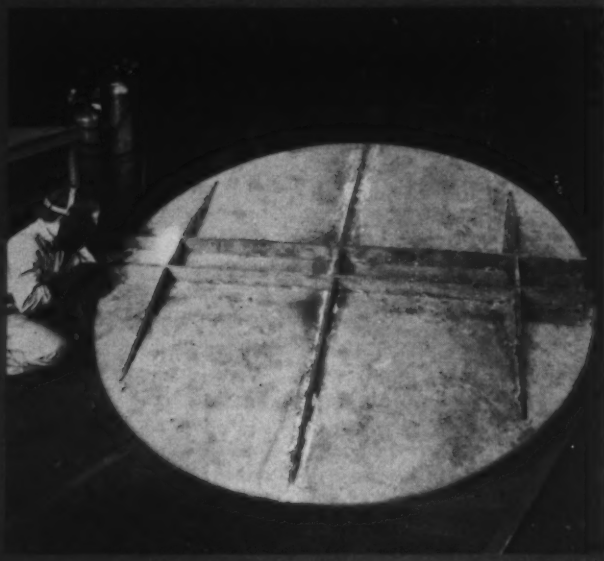
Your Dependable Source for Carbon and Stainless Steel; Also Inco Alloy Bar, Wire and Strip

A REVIEW of manufacturing procedures and materials cut part costs for Gale Products, outboard motor manufacturer, by a change in type of stainless . . . without sacrificing quality.

We Helped Them... We Can Help You

IN EXPLORING the possibilities of stainless steel for their fire extinguishers, Elkhart Brass Mfg. Co. consulted the House of Stainless. Our specialists first analyzed the need and suggested a grade with selected physicals and proper surface condition to meet every requirement. Then, we helped with the actual production steps—drawing, welding, fabricating and polishing. RESULT: a superior, corrosion-free product; less maintenance; lower cost.





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◀ Welding gusset stiffeners to main damper disc.

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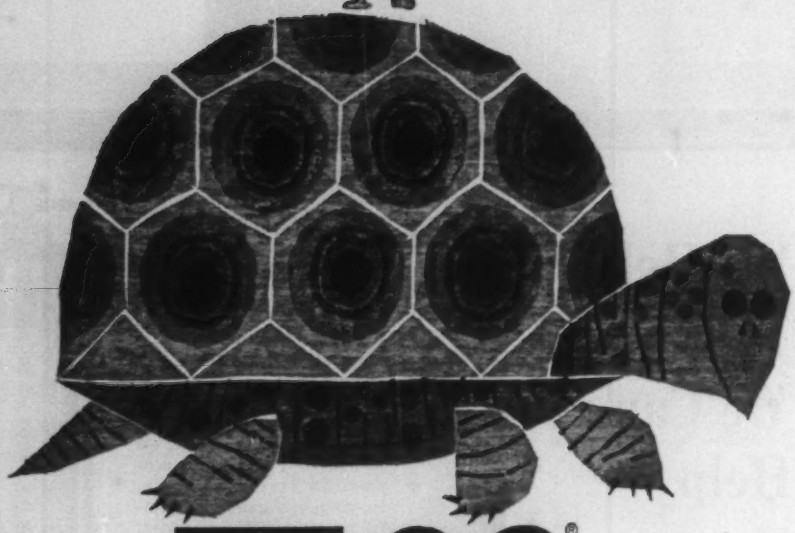

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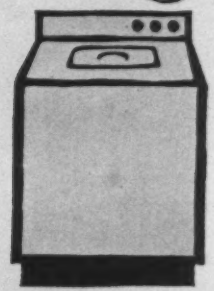

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INLAND

Goldberg, Simkin Hold Key to Possible Government Action In Auto Talks

ARTHUR GOLDBERG

WILLIAM E. SIMKIN

AS THE CONTRACT deadline in the auto negotiations drew closer late last week, the shadow of government intervention grew larger. But there was speculation in Washington that President Kennedy would not move too swiftly if a strike were called.

Reason: The President was well aware of the tendency of the union to use delaying tactics in order to drag the government into the bargaining.

• **Watchful Waiting**—The government has been in Detroit already through the efforts of the Federal Mediation & Conciliation Service headed by William Simkin. Up to now, mediators have been assigned to watch the discussions but have not actually joined them. There is some question of getting into the talks directly before a strike. Mr. Simkin himself has been in Detroit talking with his own men and representatives of both sides.

Biggest question in Washington: Can the government prove its case for outright intervention with the Taft-Hartley Act? The most prevalent opinion: The Berlin defense buildup makes the auto industry a defense industry so something approaching a national emergency would occur if the strike were allowed to drag on.

• **What to Expect**—Look then for Washington to follow this line of approach:

1. At his press conference Wednesday, Aug. 30, the President is certain to be asked about a possible auto strike. He will reply, in effect, both sides should be reasonable in their demands on each other. A strike now would possibly abort the economic recovery of the country. He will suggest the contracts be extended for another month. 2. If a strike occurs, Labor Secretary Arthur Goldberg will board the first plane for Detroit where he will let it be known that Taft-Hartley could be used, but not immediately. 3. If the strike drags on more than a week, a special labor management public group may be established to seek the "facts" of the strike, just as ex-Labor Secretary Mitchell did during the last steel strike, or the Taft-Hartley injunction will be sought.

• **Still Time**—After the flurry of company proposals and the union's sharp retort that they were "woefully inadequate," negotiators last week stepped back and admitted that there was still room for practical bargaining and that a peaceful settlement before midnight Thursday, Aug. 31, was possible.

Said Leonard Woodcock, UAW vice president: The union and GM

have reached agreements in two days during past negotiations; it could be done again.

The proposals from each of the Big Three automakers were similar. GM put the cost of the direct wage provisions at 23.7 cents for the three year life of the proposed contract. It made no estimate of indirect costs—although Mr. Woodcock said he thought they "would add up to less than a cent."

• **The Major Provisions**—Here are the major provisions of the 22 point initial proposal made by GM:

1. An annual wage increase of 6 cents per hour or 2.5 per cent—whichever is greater.

2. Addition of 12 cents of the current 17 cent cost-of-living (C-O-L) allowance to wage rates.

3. Continuation of C-O-L provision, but with two revisions during contract life instead of quarterly adjustments.

4. An income guarantee to be paid from supplemental unemployment benefit (SUB) funds which would be based on a 36 hour week. Workers would get half pay for the difference between the hours worked and 36 hours.

5. Regular SUBenefits would be extended to boost separation pay to 25 per cent and increase maximum weekly payouts from $30 to $35.

6. Pensions would be increased.

7. Hospital, surgical, medical coverage would be extended to full year, company continue to pay half of the costs.

8. Life insurance would be increased $500.

9. Moving allowances up to $580 would be granted to eligible transferred employees.

10. Vacation plans would be improved.

Mr. Woodcock was particularly irked by GM's effort to "put a cap" on C-O-L adjustments and to use SUB funds for other than direct unemployment benefits. He did admit that the moving allowance and some of the medical benefits "were steps in the right direction."

Political Pressure on Steel Prices

How Senator Gore Would Control Prices

1. **President should use powers of "moral persuasion."**
2. **If above fails, President should stir up public opinion.**
3. **FTC should "police the industry via the 1951 order" which would be violated "by a uniform price increase."**
4. **Justice Department's Antitrust Division should get busy—if additional powers are needed to make industry produce certain records, Congress should grant them quickly.**
5. **If necessary, the larger steel companies should be broken up.**
6. **If all else fails, steel prices should be brought under government control through utility-type regulations.**

FIRED UP by Harvard economist Otto Eckstein (STEEL, Aug. 21, p. 36), Senate liberals last week opened a drive to press the steel industry into foregoing any price increase this fall. The industry's wages are scheduled to rise in October under the present contract with the United Steelworkers.

Sen. Albert Gore (D., Tenn.) led the parade on the Senate floor.

Close behind came Senators Estes Kefauver (D., Tenn.), Hubert Humphrey (D., Minn.), Joseph Clark (D., Pa.), Paul Douglas (D., Ill.), Eugene McCarthy (D., Minn.), Gale McGee (D., Wyo.), A. S. Mike Monroney (D., Okla.), Frank Moss (D., Utah), Edmund Muskie (D., Maine), Maurine Neuberger (D., Oreg.), Stuart Symington (D., Mo.), John Carroll (D., Colo.), Jacob Javits (R., N. Y.), Ernest Gruening (D., Alaska), John Sparkman (D., Ala.), and Russell Long (D., La.).

Sen. Everett Dirksen (R., Ill.), a member of Senator Kefauver's Antitrust & Monopoly Subcommittee, led the opposition's reply.

• **Two Blasts**—The leadoff man, Senator Gore, fired two salvos, one a surprise blast from the President's Council of Economic Advisers, which has been conducting what is called a routine, but secret, study of the steel industry. Senator Gore announced the council had decided steel's "rate of return" in the fourth quarter of this year would "likely be equal to the average of the last 14 years, which is 10.5 per cent, after taxes." Senator Gore's figures are based on "percentage of equity" which was not further explained, but presumably refers to investment.

Editor's note: STEEL's annual financial analysis of the steel industry shows that net profits of the industry averaged 6.48 per cent of sales in the past 14 years. The range: 5.73 per cent to 7.28 per cent. The statistics are based on financial statements of major steel companies accounting for about 95 per cent of the nation's steel capacity.

Senator Gore also charged that STEEL and other business magazines were utilized by steel company executives as a "medium of communication in their mock sparring to determine which company would take the lead and how far it is safe to push up the price."

Council Chairman Walter Heller told STEEL the council had respond-

ed to such a request from Capitol Hill, but he did not go into the details of the group's conclusions. Senator Gore's office told STEEL the fourth quarter profit estimate was based on historical rates of return for certain operating rates.

The following data, used by the senator on the floor, was said to have come from the council: "Assuming no change in steel prices, but taking into account the wage increase already scheduled to take effect Oct. 1, the profit picture looks something like this:"

Rate of Capacity	Profits* Fourth Quarter
70 per cent	7- 9 per cent
80 per cent	10-12 per cent
90 per cent	13-15 per cent

*After taxes, percentage of equity.

With the council data, Senator Gore offered Dr. Eckstein's theory that 40 per cent of the rise in the wholesale price index from 1947 to 1958 should be blamed on steel prices. The senator characterized the steel, aluminum, and cement industries as areas where prices are "administered." He charged that past wage increases in steel have been "more than compensated for" by price increases.

• **Wants Action**—Senator Kefauver dug into the intricacies of the Federal Trade Commission consent order of 1951, which Senator Gore wants beefed up with Justice Department action (see checklist). Senator Kefauver reported the order's general prohibition against firms jointly adopting, establishing, fixing, or maintaining prices as "unfortunately" weakened by interpretations made since.

He extended an open invitation to his former aide, FTC Commissioner Paul Rand Dixon to let the Congress know what additional help he needs to toughen interpretations of the 1951 order.

Other arguments offered on the Senate floor took the position that it would be almost unpatriotic for steel firms to boost prices. Senator McCarthy brought up the U. S. international balance of payments problem, for example, noting that an increase in prices would further weaken the domestic industry's competitive position in world markets. He claimed a possible hike could cost steel users $500 million.

Steelmaker Says Coal O. K. for Blast Furnaces

- Lowers furnace fuel costs
- Improves operating efficiency
- Reduces coke oven requirements

COAL CAN BE used successfully as a partial replacement for coke in blast furnace operations, reports Julius H. Strassburger, vice president-research and development, National Steel Corp., Pittsburgh.

Following small scale experiments, a solid fuel injection system was set up on a commercial blast furnace at the Buffalo plant of Hanna Furnace Corp., a subsidiary of National Steel. Bethlehem Steel Co., Bethlehem, Pa., is also participating in the research venture.

Mr. Strassburger says that additional experiments remain to be done, but it looks like higher production can be obtained without increasing furnace size. It may also be possible to use low quality, noncoking coals instead of the scarce and costly metallurgical grade now required in blast furnace operation.

• **Uses Less Coal**—The new development allows a net reduction in the total amount of coking coal used. Despite that, the coal industry will benefit because the technique provides an answer to the competitive threat of natural gas and fuel oil as alternate blast furnace fuels.

Mr. Strassburger says that 10 per cent of the fuel used in the first stage of experimentation was coal. That has been stepped up to 20 per cent and will be increased to 30 per cent in September. He says that coal replaces coke about ton for ton. In modern blast furnace practice, without using injected fuels, from 1300 to 1500 lb of coke are consumed per ton of pig iron produced.

"In addition to direct technical advantages, the coal injection system means that lower cost iron will translate into savings in steel production costs," says Mr. Strassburger. Second factor: "Coal, our most abundant source of energy," he says, "would be readily available within our borders if an emergency created scarcities of natural gas or fuel oil."

• **How It Works**—Coal for the injection system is crushed and screened to minus $\frac{1}{8}$ in. size and then conveyed by a vacuum system to an overhead storage tank. The coal is passed under pressure from the storage tank to a charging vessel where it is kept in a fluid condition by compressed air agitation. Metered quantities of the coal are delivered from the vessel through a system of tubes to stainless steel lances at the tuyeres through which the coal is injected into the blast furnace. Result: Richer gases in the hearth area speed reactions.

• **Fuel Tested**—So far, tests in the Hanna furnace have been with low volatile, bituminous coal. In the future, the research program will include tests of high volatile, bituminous coal and anthracite coal.

Mr. Strassburger notes that direct savings from replacing coke with coal will vary because of furnace location and other economic factors but in any case should prove worthwhile. As to saving on investment, he estimates the cost of a coal injection system at 20 to 25 per cent of the cost of equivalent coke oven capacity.

"The engineer will be needed who can bridge the gap between science and engineering. That is, one who can monitor a tremendous amount of knowledge and translate it to practical applications, thinking in terms of the future."

CARL FREY
Executive Secretary
Engineering Manpower Commission of Joint Engineers Council

Scientist-Engineer Pinch Tightens

ON JUNE 6, the National Aeronautics & Space Administration's Lewis Research Center, Cleveland, set out to beef up its scientific staff. Its goal: Hire 135 engineers and scientists by July 31.

Success was hard earned. Press conferences in five major cities started a widespread publicity campaign followed with advertising and staff interviews in 70 cities. Between 2500 and 3000 applications resulted and by the end of July the goal had been achieved.

• **Significance**—That example highlights a situation becoming more and more problematical to metalworkers: You're going to run into more difficulty in recruiting engineering and scientific personnel as well as holding on to the talent you already have. Behind the problem is rising emphasis on research and development in the military and space races with the Russians plus industry's aggressive action to find profits in new frontiers of technology.

Competition for experienced scientific personnel, particularly those with advance degrees is fierce, necessitating not only high salary offers but provision for challenging work and academic freedom. Few graduates are not already committed to jobs, additional studies, or the military when they receive their diplomas. Carl Frey, executive secretary, Engineering Manpower Commission, Engineers Joint Council, New York, says the demand for engineering graduates is the highest since 1958.

• **Demand Keeps Growing** — Industry shows no sign of lessening its demands for scientific personnel. Westinghouse Electric Corp., Pittsburgh, employs about 10,000 of them and may need 12,000 by 1965 —possibly 15,000 by 1970. Minneapolis-Honeywell Regulator Co., Minneapolis, with about 3500, has been increasing its staff by more than 10 per cent a year and says, "This rate will continue or perhaps increase." International Business Machines Corp., New York, and Ford Motor Co., Detroit, each expect to continue adding about 500 engineers and scientists a year.

• **More Jobs than People**—A check with several leading universities indicates there will not be enough graduates to fill available jobs. Massachusetts Institute of Technology says, "There are not enough and there won't be enough." Even the mediocre students are finding jobs easily.

General Electric Co., Schenectady, N. Y., fears that the number of people going into engineering and the sciences is not increasing as it is in other fields. The Engineering Manpower Commission predicts the number of engineering bachelor degrees awarded in the next four to six years will be at or below the present level of 37,800 per year due to the decline in engineering freshmen since 1957.

• **A Complicating Factor** — The problem of scientific manpower supply is oversimplified if considered only in terms of total supply vs. total demand because it is seri-

ously complicated by specialization.

"Good engineers often walk into the plant seeking jobs but they can't be hired because they don't have the right specialties," says George Hickman, technical employee manager, Republic Aviation Corp., Farmingdale, N. Y. "The problem," he explains, "is that technology is changing so fast it is hard to find certain types of specialized experience."

The specialties most in demand include these fields: Electronics, solid state and nuclear physics, mathematics, computer technology, life sciences, telemetry, optics, astrophysics, aerodynamics, propulsion, and materials engineering.

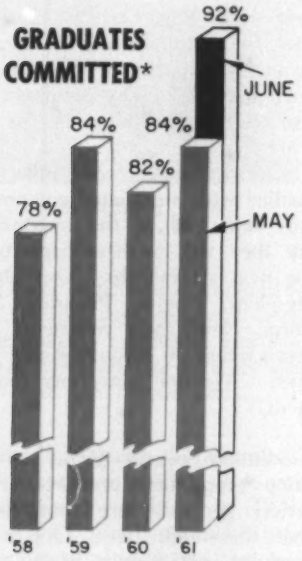
In some cases, where formal study has not prepared a man for a company's particular needs, firms have turned to on-the-job training. Some encourage and pay for advanced education. Others conduct their own specialized schools.

The National Science Foundation, Washington, says the number of science and engineering doctorates awarded annually is increasing at the rate of 7 per cent a year. But that rate has not matched the growing needs of industry and government. And the situation could become more critical for several reasons. The decline in engineering enrollment at the undergraduate level is likely to be reflected by less doctorates in that field several years from now. As the needs for scientific personnel continue to mushroom, there is the danger that potential doctors of science will be drawn off into jobs where bachelor degrees will suffice. The stepup in military manpower is apt to delay or even discourage careers in science.

• **Needed: Idea Men**—Comments on the caliber of new college graduates generally contain a note of praise for the men who can master much scientific information in few years of study. But, like Sperry Gyroscope Co., Great Neck, N. Y., division of Sperry Rand Corp., many firms observe: "Our fast changing technology often makes their training inadequate."

Coupled with the comments on the improving caliber of scientific personnel is an expression of the fear that mastery of scientific discipline and technical knowledge is displacing the ability to make practical applications of new ideas.

A lack of men who can explore new areas of science could seriously hamper industrial and military progress. In recent years, the emphasis on progress has caused research and development staffs to explode to new proportions. The National Science Foundation estimates that about 40 per cent of the more than 800,000 scientists and engineers employed by industry are engaged in R&D. Aerospace Industries Association of America Inc., Washington, says, for example, that scientific personnel performing aerospace R&D increased from 27,600 in 1954 to 60,400 in 1959. That rate exceeded the rise from 48,500 to 94,900 in the total number of scientific personnel employed in aerospace industries.



Placement Situation for Engineering Graduates

Mid-June, 1961

With Jobs	**65%**
Considering Jobs	**5.1%**
Entering Military	**10.9%**
Graduate Studies	**14.3%**
Other Specific Plans	**1.6%**
No Job Offers or Plans	**3.1%**

*With jobs, entering military, graduate studies, other specific plans.

Source: Engineering Manpower Commission.

Output per Manhour Up

OUTPUT per manhour in the private economy increased about 2.5 per cent in 1960, reports the U. S. Labor Department's Bureau of Labor Statistics (BLS).

The gain was lower than the postwar (1947-60) average rise of more than 3 per cent per year. Reason: Business dipped late in the year, and productivity gains generally tend to be less than average during economic declines, and higher in recoveries. The increase in 1959 was more than 4 per cent.

Manufacturing output per manhour in 1960 climbed about 2 per cent—slightly under the postwar rate of 2.9 per cent a year. Total output (gross national product measured in 1954 dollars) increased 2 per cent in 1960, also less than the postwar average. Nonmanufacturing output per manhour increased by 2.2 per cent, close to the postwar average of 2.3 per cent per year.

Output per manhour, as used in the BLS study, refers to the constant dollar value of goods and services produced in relation to the hours of all persons engaged in private industrial production.

Ore Loader Installed

Quebec Cartier Mining Co., a subsidiary of U. S. Steel Corp., is operating its huge ship loader (100 tons of ore per minute) at Port Cartier, Que. The loader is the terminal unit of an intricate conveyor system which delivers ore to the dockside from dumper installations and buildings. It was built by the Mechanical Div., Dominion Bridge Co. Ltd., Montreal, Que.

Contract Stamping Shipments

1961 Index
October 1958-March 1959 = Zero

Jan.	0	May	+7
Feb.	−9	June	+3
Mar.	0	July	−25*
Apr.	−3	Aug.	+5**

Source: Pressed Metal Institute.
*Estimate unadjusted to include vacations.
**Preliminary estimate.

Profits down in '61 vs. '60, but . . .

Stampers See Good Fourth Quarter

THOUGH business for contract stampers bobbed up and down in the first half of this year, there's hope for an average third quarter and a good fourth quarter.

Despite the anticipated climb, shipments won't be good enough to overcome the effects of a disappointing first quarter, say respondents to a STEEL survey of the industry. As in most industries, inquiries have perked up compared with the situation a year ago, but most companies are converting prospects into customers at a low rate. The stampers report making sales on only 7 to 8 per cent of inquiries. Total effect: 1961's profits generally will be down from 1960's.

Next year should be better. The industry's executives, by a ratio of 11 to 1, feel that dollar volume of shipments in 1962 will exceed the 1961 tally. The average increment: About 15 per cent.

• **Price Specter**—Chances are better than even that the jobbers will boost prices within six months to cover increased labor costs and higher outlays for materials. Nearly all of them are warily eying the steel pricing situation. As Carter C. Higgins, president, Worcester Pressed Steel Co., Worcester, Mass., puts it: "If steel goes up, we'll raise prices." That sentiment is favored by a ratio of 8 to 6.

The price picture is especially complicated for the contract firms. A Toledo, Ohio, president moans: "We're smack in the middle of a high labor rate, low selling price area." Mr. Higgins says the industry's major problem is excess capacity. Henry R. Kolk, vice president, Kolk Mfg. Co. Inc., Buffalo, cites the vigor-sapping companion of excess capacity: "Tremendous price cutting." The stampers are also beset by shrinking markets and profits.

Though many companies are saddled with antiquated equipment, only one-third of the respondents say they will increase capacity in the next six months. Lon Orent, president, Abalon Precision Mfg. Corp., New York, comments that depreciation is troublesome, and says: "We don't buy any (equipment)!"

• **Solution Seekers**—Firms that develop proprietary products or diversify generally are doing better than the standpatters. One is successfully marketing a brake actuator for boat trailers. Another is

producing dispensers for paper towels and rolls and paper manufacturers are selling the units through their outlets.

A Milwaukee jobber says he's turning to low cost tooling and more efficient material handling; a Detroit stamping company is improving production methods and instituting better cost control; an Ohio firm is actively developing and promoting new products; a Chicago stamper is promising customers highest quality and best delivery service; another Milwaukee jobber is plagued by competition from captive shops and is retaliating by pointing out hidden costs and other disadvantages of captive shops; a New England firm is putting higher engineering charges on special jobs.

• **Market Promise** — Many companies are seeking ways to fill in the valleys between the peaks on automotive and appliance contracts. They see promise in stamping jobs on electronic components, chassis, and cabinets; new electrical products; precoated materials; material handling equipment; railroad equipment; capital goods; construction

JEFFERSON D. KEITH

hardware; agricultural implements. One stamper says he wants larger, more complex assemblies and short runs (buyers tend to produce their own long run, simple jobs).

• **What's Needed?** — Jefferson D. Keith, named managing director of the Pressed Metal Institute (PMI), in January, has been crisscrossing the country, sensing the tempo of the industry and checking ways to pull it out of its plight. He says: "The industry faces a number of predicaments. Contract shops have knowhow, but not modern equipment. They have to automate to survive. Operating costs have to be cut. Stampers are being pushed out of markets by captive shops."

Those views are underscored by these comments from a survey respondent: "Some outfits lack aggressiveness and sit back waiting for business to come to them. They need to establish sales policies and organizations."

Various districts of the PMI are attempting to meet competitive forces by conducting meetings for members that are attended by venders who show new equipment, devices, and materials. The first meeting in Chicago was so successful that Mr. Keith recommended it to other districts.

As another step toward solving the industry's problems, PMI has chosen Planning for Profits as the theme of its annual meeting Sept. 24-28 at Point Clear, Ala. The offerings: Budgeting, financial analysis, profit margin objectives, estimating, individual job costing.

Machine Profits by Its Mistakes

THE CYBERTRON, a machine with humanlike capacities (it learns, makes decisions, profits by its mistakes, and tells how to solve baffling problems) has been developed by Raytheon Co., Lexington, Mass., electronics firm.

The machine scored remarkably well in learning data on electrocardiograms, military problems, and sonar signals, reports Richard E. Krafve, Raytheon president. In a matter of hours (vs. months for humans), the Cybertron learned techniques needed to differentiate between real and false target echoes on sonar. "Our prototypes open the way for development of more advanced versions," comments Mr. Krafve. Among them: Units for analyzing radar data, sorting industrial and agricultural products, and helping weather forecasters.

• **How It Works**—The machine learns by trial and error. It stores data, relates new facts to experience, and constantly improves its skill. When the Cybertron errs, the teacher pushes a "goof" button—causing the machine to re-evaluate decisions and modify its memory. As a reward for correct responses, it is allowed to operate without interruption. The teacher can also point out the correct answer.

The smaller of two models, the punched tape fed K100 (see photo), is working on military problems for the Department of Defense. A larger model (K200), now in final development, will recognize and type out all typical American word sounds. That version will be capable of multiplying nearly tenfold the number of voice messages that can be transmitted simultaneously on one radio band. The machine will squeeze spoken messages into tiny pulses which will be reconverted into sound by a speech synthesizer at the receiving end.

Here's What Killed Tax Credit Plan

1. **Berlin crisis—billions added to defense, bringing greater possibility of corporate tax boost next year.**
2. **General lack of enthusiasm for the measure by business.**
3. **Sen. Harry F. Byrd (D., Va.).**
4. **Ten Republican members of House tax committee.**

ANY LAST MINUTE struggle to save the tax credit plan for modernizing industry will fail. The factors that killed it are shown above.

But all is not lost, suggest several Washington sources. "No one on Capitol Hill, whatever his political philosophy, denies the fact that much of U. S. industry's equipment is obsolete," observes one tax expert. If the observation is true, there is a chance for legislation or administrative action next year on depreciation reform or some other approach to modernizing U. S. industry.

Another source suggests now is not too early to plan next year's approach, "even though we can't guess what world crisis may be upon us when Congress reconvenes in January." He suggests the tax credit plan died in Berlin: "The merits of its worth had nothing to do with its death." Now, industry might re-examine the White House plan and more forcefully bring the need for depreciation reform to the attention of the Treasury, he says. An association executive sums up another concern of Washington advocates for depreciation reform: "I wonder if the phrase 'depreciation reform' hasn't been bandied about too much. Perhaps Congress doesn't really know what is needed, even though it recognizes the problem."

● **ELECTION YEAR HURDLE**—Nineteen sixty-two is an election year. Can business anticipate the House voting any sort of aid which can be construed by some as a "giveaway to Big Business"? A White House official admits: "We have faced the possibility of nothing getting through Congress this year. But, as yet, we haven't any new ideas about what to recommend next year. It is not certain that the tax incentive program, once killed, will be requested again." The Treasury Department has promised the House Ways & Means Committee a program for depreciation reform when its depreciation survey is completed "in a few months," but cautious observers expect President Kennedy to think twice before asking the Treasury to O.K. wholesale reforms.

Chances are that the White House will endorse the politically safe position of a tax package which takes away as much as it gives to business. If some depreciation reform were recommended, then expense accounts and "loopholes" would be in for tough treatment so revenue losses could be offset.

● **REPUBLICAN POSITION** — Fiscal responsibility and political tactics combined to give the ten Republican Ways & Means members the opportunity to kill the incentive program, which they didn't like anyhow.

They said: "Close examination of the modified tax credit plan reveals it to be a scheme contrived to subject our private economy to a government controlled on again, off again tax incentive. It would arbitrarily bestow a tax giveaway upon some taxpayers and deny it to others . . . it must be remembered that the proposed business tax credit amounts to unrecoverable and outright tax forgiveness that comes at a time of massive spending . . . Any tax deferment resulting from depreciation reform would be automatically recoverable in the future and would be allocable more equitably among our taxpayers."

● **ON THE SENATE SIDE**—The generally lukewarm attitude of business toward the tax credit was noted by Sen. Harry F. Byrd (D., Va.), chairman of the Senate Finance Committee. He used that factor as reason enough for discouraging any thoughts that the incentive might be approved by his committee. Realization that a bill would fail in the Senate tempered the attitude of Rep. Wilbur Mills (D., Ark.), even though he decided for awhile to go along with the 8 per cent across the board credit. As chairman of Ways & Means, Representative Mills could probably have pushed a bill out of committee despite Republican opposition, but he didn't want to see it fail.

Senator Byrd, reliable sources report, is practically committed now to some sort of basic, realistic, depreciation reform. His opposition to the credit and to any fast writeoff scheme is out in the open, so decisions on what approach to use next year should be made in that light, says a tax lawyer.

Diesel locomotive crankshafts, each weighing nearly 3000 pounds, being heated for upsetting the end flange at Park Drop Forge Company.

Heating Time Cut 76%

with

TOCCO* Induction Heating

Faster Production—Park Drop Forge Company reduced the heating time on these giant crankshafts from 1½ hours with an oil type furnace to 22 minutes with a new 60 cycle TOCCO Induction Heating setup. Six TOCCO heating stations furnish a crankshaft to the upsetter every 3½ minutes. About 14″ of the 10″ diameter end of these 12 foot long crankshafts is heated to 2200° F. for upsetting the end flanges.

Other Advantages—Park Drop Forge engineers report practical elimination of scale which vastly increases the life of expensive upsetter dies. Also better metal flow is obtained because of TOCCO's uniform heating.

Most importantly, working conditions are greatly improved because of TOCCO's lack of radiant heat and gases. Workers can now perform all day—even on hot summer days—an impossibility with the old oil furnaces.

If you have a metal heating problem—forging, heat-treating, brazing, soldering or melting—why not investigate TOCCO for fast, economical results.

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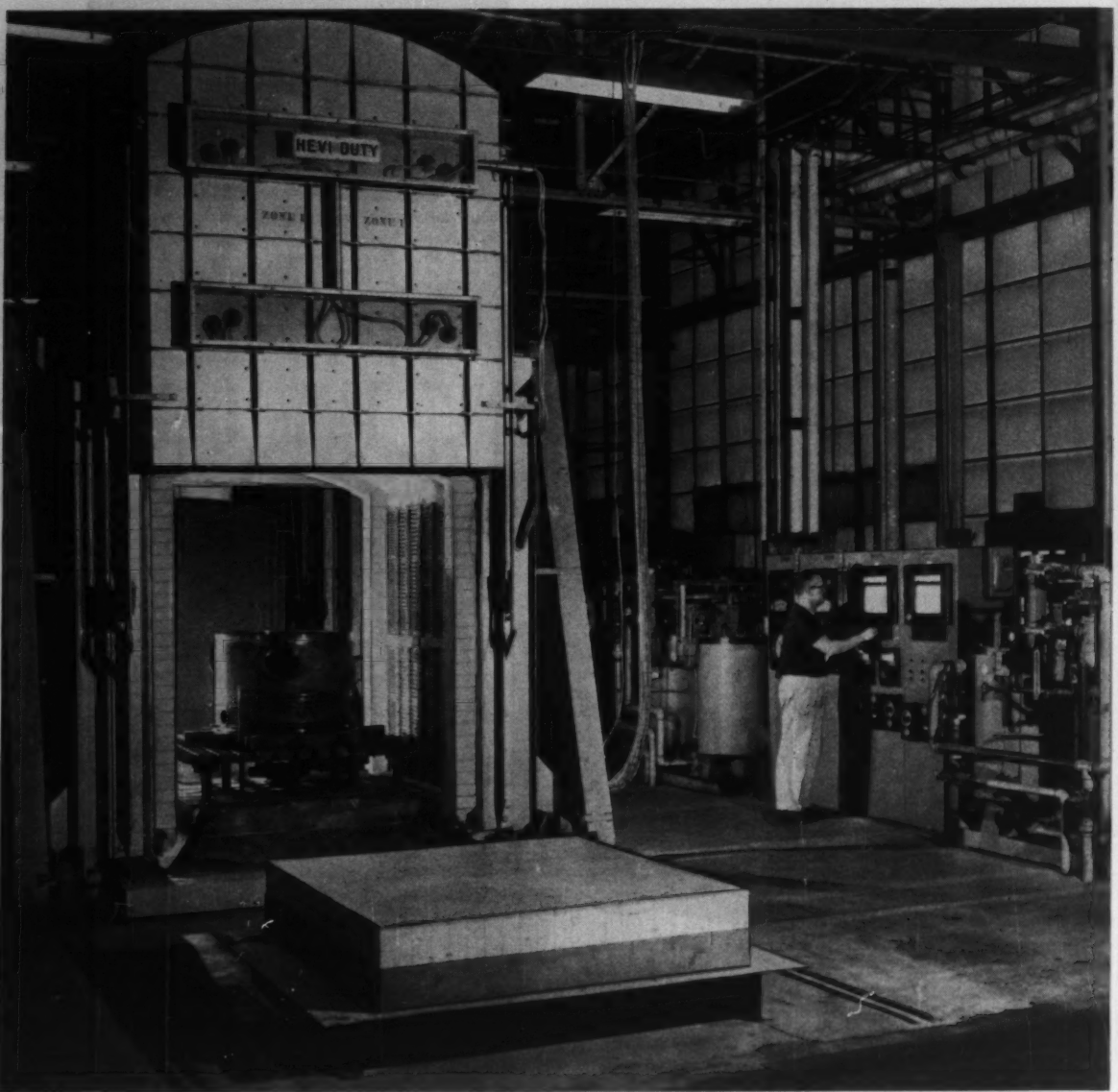
Another example of Hevi-Duty Engineering Ingenuity



Special car bottom furnace moves to the work... solves head room problem, holds ± 10°F accuracy

Tapco Group, Thompson Ramo Wooldridge, Inc., Cleveland, wished to use bell furnaces but lacked necessary head room in the heat-treating area. Hevi-Duty engineered the perfect solution.

A special car bottom furnace was designed. It moves over the load . . . in contrast to the usual car bottom furnace where the load moves into the furnace. Two pedestals are used to permit continuous use of the furnace. Atmosphere-type retorts allow for slow cooling while a second load is being heated in the furnace . . . thus the furnace is used 24 hours a day . . . seven days a week.

Operating in the range of 1200°F, the furnace holds temperature uniformity to ±10°F. Work being tempered or stress relieved in this furnace has actually come out brighter than when it entered.

In more than four years of operation neither this Hevi-Duty car bottom furnace nor a duplicate furnace, installed a short time later, has required replacement of heating elements.

Talk with Hevi-Duty about your next heat-treating project. For information about a full line of electric or fuel-fired industrial furnaces and ovens, call your Hevi-Duty sales representative or write to Hevi-Duty, Watertown, Wisconsin. H-35-61

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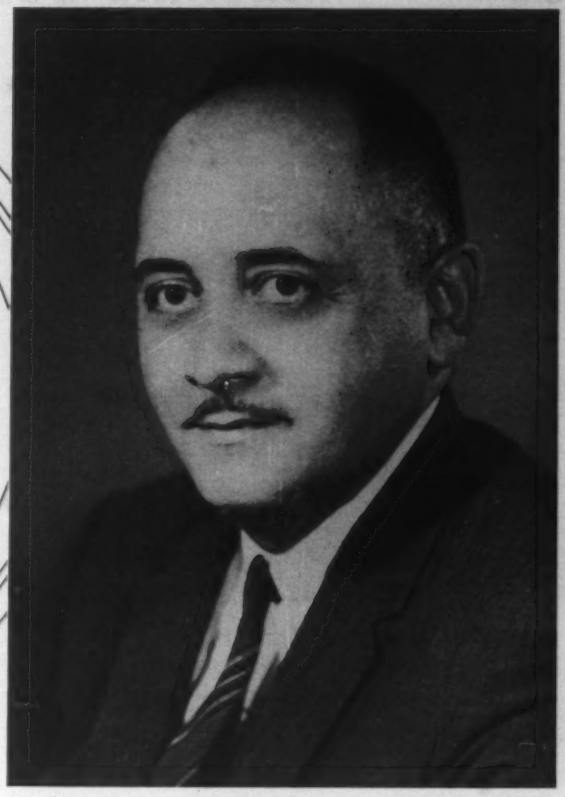
'During the next 60 seconds, 2000 pages of books, periodicals, or reports will have been published somewhere in the world. If you attempted to keep fully informed of everything going on—through reading—you would fall behind an estimated 1.1 billion pages for every solid year that you would devote to reading.'

ALLEN KENT
Associate Director, Center for Documentation & Communication Research
Western Reserve University



A literature deluge forces new methods to . . .

Inform for Profit Growth

PROFIT GROWTH

"THE TIME is not far when a new revolution will occur in the storage and dissemination of data, similar to that which was produced by the invention of printing. . . . It is possible to visualize the following information service of the future:

". . . All arriving and all existing data, after the necessary editorial processing, are photographed at a considerably reduced scale. Instead of large runs, only several copies of such microfilm are produced and are sent to one or several information centers. These centers transmit continuously over many waves all data available in them at a tremendous sequence frequency of frames of microfilm. With such a speed all data accumulated by humanity can be transmitted over many waves within a comparatively brief time . . . Any frame of the microfilm can be received in any place on a special television screen equipped with a selecting device."

That comment appeared in a Russian periodical in 1955. It indicated that the Soviets were going all-out to solve a problem which relatively few even recognized in the U. S.

Antiquated Searching

U. S. industry and government are paying at least $1 billion a year (15 to 20 per cent of our national

Machine Searching Copes with the L

One center for mechanized information retrieval that's helping to cope with the literature deluge is at Western Reserve University.

The school's Center for Documentation and Communication Research opened doors in 1955. Methods have been developed for the analysis, encoding, and machine searching of the literature, so that professionals in various fields may be kept currently and continuously informed of everything published in the world on problems that are of interest to them. The center's program has led to an operational literature-searching service for the American Society for Metals. It will also lead to similar programs for the American Diabetes Association, the Communicable Disease Center of the Public Health Service, and the U. S. Office of Education.

Here's how industry can use those services: A steel company, for example, might be trying to determine what the competition is doing that would have an effect on steel sales. It could request a literature search on alloy research. It could also ask for a special library to be created in other areas of interest to give it clues about the competition.

The steel company would order its abstracts through the American Society for Metals, which has helped to finance and has co-operated in developing WRU's machine searching techniques. The center now does the searching for an ASM retrieval service in metallurgy. It has a three-way price list:

1. For $50 per month, you can get a routine search in an area every two weeks.
2. For $200 the first year, you can get a retrospective search in an area. The price declines progressively the farther back you go. In addition, there's a charge of 10 cents per abstract.
3. For $10,000, you can get a copy of all abstracts in your general field of interest and do

research expenditures) for antiquated literature searching services.

But our lag can be partially rationalized. The problem is like an iceberg—enormous but largely unseen.

"We don't know how much we are missing because we don't see it," points out Mr. Kent. We can't measure the effectiveness of good literature searching directly, but we can gage it indirectly by the results of research and development. No one can now say that Russian research efforts are inferior.

The Soviet All-Union Institute of Scientific & Technical Information in Moscow (called VINITI) has a staff of more than 2000. It was set up in 1952 to acquire, analyze, abstract, and disseminate to scientists and engineers the world output of technical periodicals. In 1959, it was receiving 15,000 periodicals and processing nearly 500,000 articles a year. Russian abstractors get paid five times as much as their U. S. counterparts.

Why Search?

Some U. S. companies regularly do literature searching as part of their research—Union Carbide Corp., General Electric Co., E. I. du Pont de Nemours & Co., to name a few.

Their research reputations are all high. The research minded pharmaceutical industry is also strong on searching. Smith Kline & French Laboratories, for example, searches the literature on every research project it undertakes.

Thomas Vaughan, vice president of Colgate-Palmolive Co., estimates that if better library methods could cut only 1 per cent of the research worker's time, they would save U. S. industry about $20 million a year.

Lack of literature searching leads to wastes like these:

- The director of an engineering organization spent $50,000 and a year's time in repeating an unsuccessful design program for building military trucks. He had rejected

Literature Deluge

the searching on your own computer.

Before a machine can take over the searching, several human tasks are involved. First, the world's literature on the subject must be acquired (in metallurgy, the center scans more than 2000 publications continuously). Then the articles must be analyzed by scientists who understand the subject matter and the foreign languages in which many of the articles are written. More than 50 "abstracters" perform the job for the center.

Two types of digests are written—one in ordinary English, the other in telegraphic style that can be read by the General Electric 225 computer (after the digest has been translated into a semantic code which records the inherent meanings of the words written by the abstracter).

Then the digests are ready to be loaded into the magnetic tape library of the GE 225. In the accompanying picture of the computer, an engineer examines one of the 750, printed circuit, logic component, pluggable cards in the cabinet. To the upper left of the console are the magnetic tape units. Each role of tape will store about 2500 documents.

The magnetic tape library is maintained in a search-ready condition until questions are asked by scientists throughout the world.

Next comes another human interlude, when the questions are analyzed and programed into machine language and machine logic. Then the GE 225 is ready to search at a rate of up to 100,000 articles an hour for up to 50 questions at once, identifying those articles in the magnetic tape library which provide the information in response to the questions.

Finally, the English language abstracts for those pertinent articles are sent to those who asked the questions.

At right is an example of the progression in machine literature searching.

STEP No. 1

Question from client involves any technical data on recent improvements in diecasting.

STEP No. 2a

Question is coded to Semantic Factor Code of words to be searched, i.e.:

A = C-NS, B = 1025 — Casting
C = M-TL, D = P-SS, E = 3001 — Diecasting
F = M-CH, G = M-CL, H = 2009 — Die

STEP No. 2b

Question is put into logical structure for searching, i.e.:

$[(A \cdot B \cdot C \cdot D \cdot E) + (A \cdot B) \cdot (F \cdot G \cdot H)]$

This reads (A and B and C and D and E) or (A and B) and (F and G and H)

STEP No. 3

Cards are key-punched with above 2a and 2b and fed into machine.

STEP No. 4

Machine gives Request No. and Document No. pertaining to question as in the sample given below.

138-E. Sound Waves Improve Diecasting Quality. John A. Weber and Earle W. Rearwin. FOUNDRY, v. 89, Feb. 1961, p. 69-71.

Application of ultrasonic and sonic wave length energy during diecasting to improve structure, mechanical properties, and surface finish, and to reduce rejects. (E13, 1-74)

it himself ten years earlier, but he couldn't profit by his experience because the original report was buried in the company's library.

● In 1950, an article on the application of Boolean algebra to electrical circuits appeared in a Soviet Academy of Science journal. Though an English abstract was later published in *Mathematical Reviews*, it was not "discovered" until five years later—after several teams of mathematicians in several U. S. companies had spent more than 15 manyears in unsuccessful attempts to solve the problem.

Our research history abounds with examples like those because of obsolete library methods. We can't keep track of the mounting volume of scientific and technical research nor make it accessible quickly.

Some people wonder if it's worth the effort. An executive of a steel company insists that it is cheaper to repeat an experiment, if the cost is under $100,000, than to pay for a search to learn if it has been done before.

Abstracting costs aren't quite that high in most fields. One survey of prominent companies indicates 15 firms were spending $5000 to $10,000 a year on the activity; ten were spending $10,000 to $15,000

annually; five were budgeting more than $50,000 yearly.

Those figures don't reflect overall needs. For example, 359 organizations responding to a survey Mr. Kent did for Western Reserve estimated they would spend at least $2.9 billion annually if reliable searching facilities were available.

The study revealed that 13 automotive companies would spend a total $4.4 million annually. Other estimated expenditures: Metal processing companies, $11.1 million; electrical firms, $120.5 million; government and private organizations in nuclear work, $120.9 million; military and university scientists, more than $1 billion each.

Note that metalworking companies seem to underplay the importance of searching. Even people who should know better class searching as a frill. Part of the blindness also comes from a vague feeling that the innovator works best when he is unencumbered by the past.

Who Does Searching?

Note also that the $2.9 billion potential for searching is presaged on the assumption of good facilities. Are they available? More than 300 organizations in the U. S. offer specialized abstracting services. They do good work in their areas, but the state of the art is alarming because U. S. documentation is fragmented and decentralized. The services are unco-ordinated and lack standards.

Western Reserve is in the forefront in urging co-ordination. Mr. Kent believes three alternatives are open to us to get it:

1. Have the major abstracting services agree to divide the pie and to standardize.

2. Get a profitmaking group to step in to invest $5 million to $10 million in the activity as a commercial venture.

3. Let the federal government take over.

The National Federation of Science Abstracting & Indexing Services, Washington, is trying to do something about No. 1. It has asked many government and private groups for suggestions on how to formulate a national program. The replies are due by Sept. 1, and the federation hopes to have its proposals ready within a year.

Several groups are studying No. 2. Two represent Rockefeller money.

But the most likely alternative is No. 3. Mr. Kent and others are least enthusiastic about this one because of the vagaries of federal budgets and the dangers of overcentralization.

But the approach may get nowhere because "the posture of our government is not favorable to U. S. documentation," says Mr. Kent.

This tack is favored: Poll the scientists. See what they think they want.

Several federal offices do abstracting, but their efforts aren't co-ordinated, despite much talk in and out of Congressional hearings.

National Center Needed

Regardless of the method, Mr. Kent believes we need a national documentation center. He believes it could be established with a budget of about $36 million, which would be spent over a decade. He thinks the services could become financially self-supporting by the end of that time.

In effect, the center would be handling a new form of "publication"—encoded on magnetic tape or other easily resproducible storage medium. Fees from a large number of clients could be used to amortize the costs of machine searching. Many large industrial organizations independently process their materials at huge costs in duplicated effort.

A national center would not prevent the formation of other specialized processing centers, whose output might be purchased or rented by organizations wishing to operate their own research machines.

A planned network of specialized centers would make possible a blend of centralized and decentralized processing and use of research literature. The nation's technical and scientific societies should play a key role in such an enterprise.

"It's our responsibility to take the initiative in solving the information problem facing the nation's engineers and scientists," says Allan Ray Putnam, managing director of the American Society for Metals.

ASM has practiced what it preaches by pioneering (with Western Reserve) with its unique machine searching program (see exhibit on Page 50). Many observers feel WRU's center is the farthest along the road toward a national documentation library—although it still has a long way to go.

The Future

"The strong centralized system of the USSR is not practical or desirable for this country," believes Mr. Kent. "We are too far along on our own way. For us, the reasonable course is the creation of a new type library. Many separately staffed abstracting services and libraries would still operate, but there would be co-ordination on a national scale."

He continues: "Internationally, a co-ordinated program for processing scientific literature is a technical possibility today if technicians of the varous countries can agree on philosophy, principles, and detailed codes."

Mr. Kent suggests that the international program can be furthered if three conditions are met: If we work with other nations in formulating a common machine language, if we develop a co-ordinated system for the U. S., and if we increase government and private support of those efforts.

Dr. A. N. Nesmeyanov, president of the Soviet Academy of Sciences, says that the solution to the scientific information question is now the most pressing problem whose solution has been undertaken in the USSR.

And in the U. S.? "Our situation borders on being a national scandal," believes Mr. Kent.

PLAN FOR PROFIT GROWTH

Export for Profit Growth

On Sept. 11, STEEL will show how you can improve your exports to improve your profits. For a free copy of any or all articles in this series (appearing biweekly since Jan. 16) write: Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

SLABS, BLOOMS AND ROUNDS ON THIS VERSATILE MILL

Quick handling of ingots another dividend

"Big investment, big dividends" sums up the new automated blooming mill illustrated above. Key component of a new $14 million steel plant, it was built and designed by Bliss' Rolling Mill Division to enable its owner, a prominent manufacturer of heavy equipment, to meet mounting orders for seamless tubing and welding fittings.

Here is automation at its smoothest. With only a handful of men in efficient control pulpits, the plant can turn out blooms of many shapes and sizes.

Heart of the operation is a new, 40" x 90" high-lift blooming mill, whose rolls are automatically set for each pass by punched cards. Taking the ingots poured by the new 100-ton electric furnace, it rolls them into the size required.

Of special interest is the mill's unusually versatile design. Thanks to it, the plant is able to handle round shapes as well as blooms and slabs, simply by changing the rolls. The latter were supplied by Bliss' Mackintosh-Hemphill Division.

According to the plant superintendent, this new plant has increased the company's melting and rolling capacity a full 50%. And based on its proven operating performance, the new Bliss mill will be ready to take any additional new load in stride.

Whether your plans call for a big outlay or a modest one, it will pay you to discuss them with Bliss. To learn how other firms have . . . and have profited . . . write for our 84-page Rolling Mill Brochure, Bulletin 40-B.

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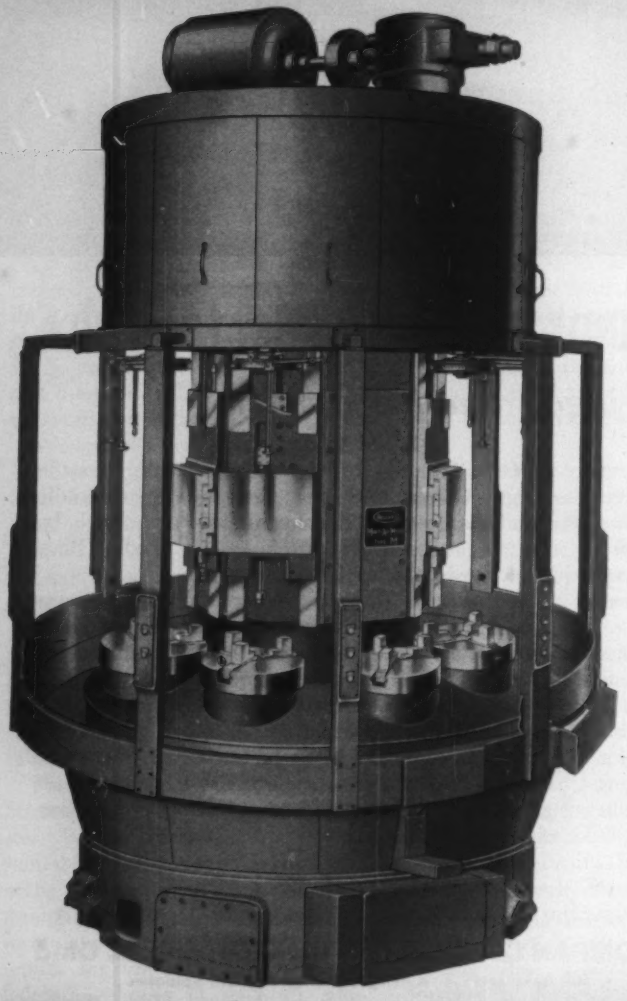

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Detroit Sees 1963 As Big Change Year

Here's What to Expect

- Two new cars
- Three new engines
- More unit bodies
- Standardized transmissions

WHILE DETROIT'S marketers are setting the stage for the curtain raiser on 1962 models, engineers and designers working behind the scenes are well on their way with preparations for the 1963s.

At this point, it looks like 1963 will shape up as one of the most extensive change years on record. Early estimates put the industry's tooling bill above the $4.5 billion mark, almost double what it cost to bring the 1962 cars to market.

So far, only tooling with long leadtime has been let. That includes machine tools for some engine and transmission lines as well as initial patterns and dies for body stampings. Most of the assembly line tooling will start breaking in the next 60 days. Ford, Chrysler, and General Motors' Fisher Body Div. all have let contracts that indicate major changes in styling and body construction. Some of the dies for sheet metal "skins" are already more than half finished.

Probably the most significant factor: The 1963 cars will have a vast number of interchangeable components. Although individual cars divisions (particularly at GM) may fight part standardization, the drive for such a goal has become one of the auto industry's chief wedges in staving off the profit squeeze. It's also the only way the industry can afford to bring out the vast variety of models it's building. So far, the emphasis has been on interchangeable parts.

The Buick-Oldsmobile-Pontiac compacts, for example, share a single body shell although each has a different sheet metal skin. The same interchangeability extends to transmission cases, frame members, and some suspension parts. In several cases, divisions are able to assemble standard and compact sized cars on the same line.

The next step is the increasing use of common machine tools to mill, bore, ream, and tap several different kinds of parts. The best example this year has been the engine line at GM's Pontiac Div. which handles both V-8 and four cylinder blocks through the same tools. Look for common tooling to machine transmission cases, driveshafts, and other chassis components. That trend on the part of automakers cuts down on the amount of money spent for model changes. Some industry toolmen are of the opinion that a change as major as 1963 purports to be would normally call for better than $6 billion worth of tooling.

● **New Cars Coming**—Autodom is offering 400 different models and styles of automobiles for 1962 compared with 354 in the 1961 model year. The 400 figure will be increased in 1963 by the addition of the long awaited Cardinal and by another Buick model. Unless tipsters are wrong, Chevrolet will spring its small car too.

Ford has unofficially conceded that tooling programs for its 97.5 in. wheelbase subcompact have been

Shift in Optional Equipment Shown

(Percentage of model run)

	1961*	1960	1959	1958	1957
Automatic Transmission	73	73	76	80	79
Power Steering	37	38	40	43	38
Power Brakes	23	25	28	30	30
V-8 Engines	54	58	70	74	83

* Preliminary. Source: *Ward's Automotive Reports.*

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returned to this country for completion. The Cardinal will share a common chassis with similar cars Ford plans to market in England and continental Europe. Each job will have its own sheet metal exterior to meet different styling philosophies.

As tooling stands now, the Cardinal apparently could be ready for introduction next summer, but chances are Ford will hold off for the 1963 season. Key features of the car are its 90 cu in. cast iron V-4 engine, front wheel drive, and unitized body. Suspension will be unique, say STEEL informants. Instead of conventional coil or leaf springs, Cardinal will sport a transverse, single leaf spring across the front to suspend the driving wheels.

Reports from Flint, Mich., are that GM's Buick Div. is keeping one more model up its sleeve. It plans to introduce a variety of sports versions of its Special model this year, but what it hasn't reported on is another personalized car that supposedly will be a direct competitor to Ford's Thunderbird. Industry talk has it that the car will be built on the 123 in. Buick Le Sabre wheelbase with a modified chassis and different sheet metal. Like the T'Bird, it will be a highly personalized car with bucket seats, full power assists and a new V-8 engine. It will list close to the $4170 price of the hardtop Thunderbird. Officially, Buick has no comment on such a car. Unofficially, some division sources have told STEEL the car may be introduced in the middle of 1962.

And the feeling is strong around Detroit that Chevrolet has decided to go ahead with the 2000 lb car it has designed to compete with the Cardinal. Prototypes have been checked out at Chevrolet's Engineering Center and at GM's styling facilities nearby. A few suppliers say they've been asked to quote on limited quantities of specialty parts that GM normally doesn't make itself. It's thought that much of the diework is being done at Fisher's Grand Blanc plant near Flint. And several venders have remarked that they've seen a number of parts come through under the H-35 designation that couldn't possibly fit on that car, but that are adaptable to a lighter vehicle. GM is a past master at camouflaging its activities. It may be that two cars are hiding under the H-35 tag. If so, look for a 98 in. wheelbase car to appear at Chevrolet in 1963.

• **Bodies Changed**—In addition to new models, present standard sized cars at GM and Ford will get new body shells. So will the larger Chrysler products and the Lark. The reports are that standard sized Chevrolets and Pontiacs and the 123 in. wheelbase Buicks and Oldsmobiles will go to unitized construction. The larger Ford models will continue to move frame members outboard into the rocker panel area where they can be welded into the body, but that is not a conventional unit body design (STEEL, Mar. 20, p. 78).

U. S. Auto Output

Passenger Only

	1961	1960
January	415,857	688,690
February	364,385	659,298
March	407,959	654,241
April	446,739	582,869
May	542,303	611,260
June	599,474	613,136
July	399,157	434,377
7 Mo. Totals	3,135,874	4,243,871
August		305,514
September		407,691
October		617,972
November		597,638
December		523,422
Total		6,696,108

Week Ended	1961	1960
July 22	102,875	112,179
July 29	74,831	107,019
Aug. 5	32,464	103,504
Aug. 12	21,029	84,139
Aug. 19	13,766†	47,437
Aug. 26	30,000*	38,952

Source: *Ward's Automotive Reports.*
†Prelin.inary. *Estimated by STEEL.

• **More Engines**—Five new engines will be introduced on 1962 cars. At least three more will appear the following year. One of them may be aluminum. The others will be gray or nodular iron. In each case the engine reportedly has been designed so it can be machined on the same line with present powerplants simply by adding a few stations or changing the fixtures on the machine lines.

Ford will be announcing a small V-8 engine this year with some 220 cu in. displacement. For 1963, the company will be back with another king sized V-8 to replace its 292 cu in. powerplant. It also will have the 90 cu in. V-4 that's slated for the Cardinal.

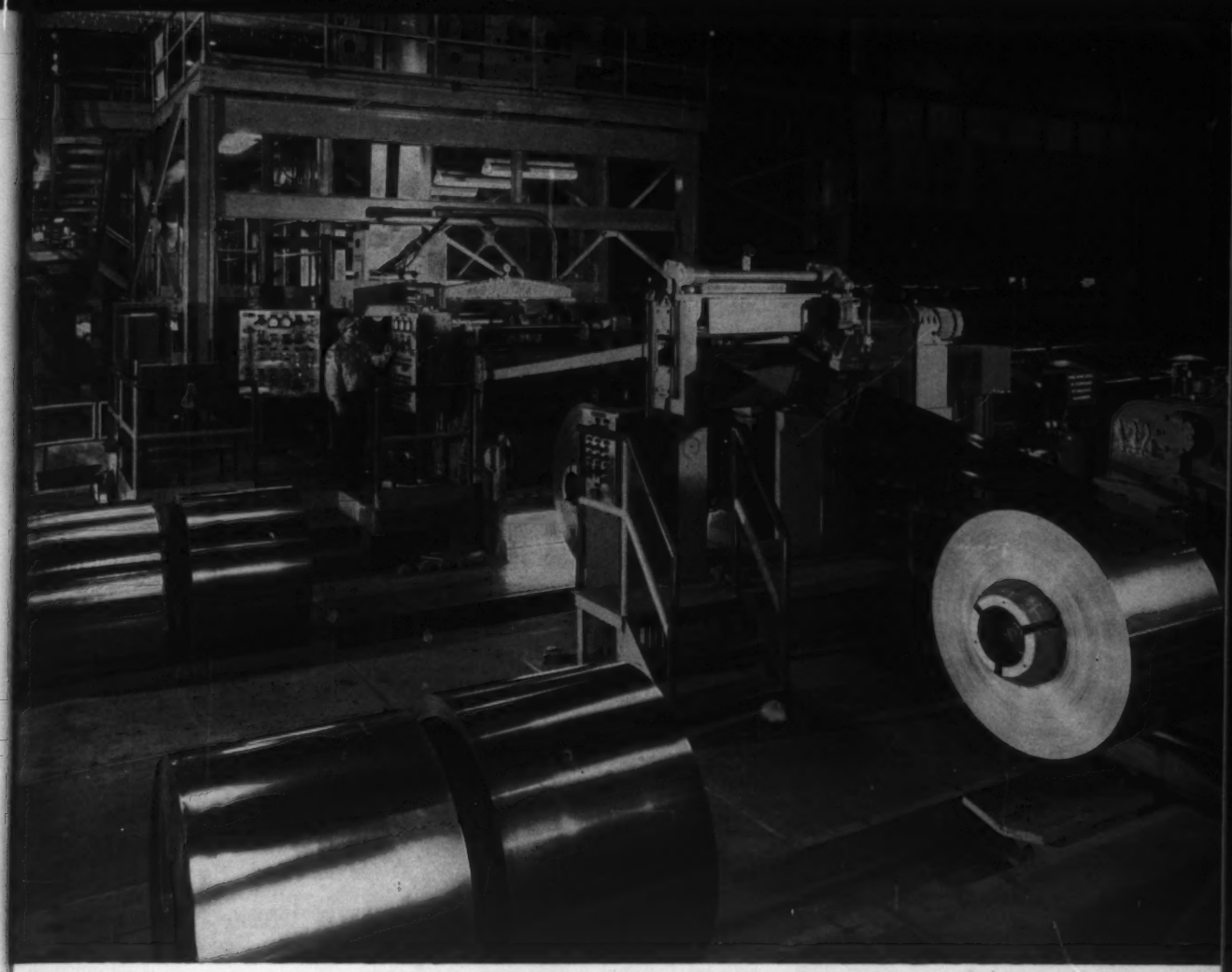
A larger V-8 appears to be in the works at Buick too. It apparently will replace the 364 cu in. job that now goes into Le Sabre and Invicta models. If rumors are right, it will have the same bore dimensions as the V-6 that Buick will announce next month.

Under design in Italy is a V-6 aluminum engine that Doehler-Jarvis Div. (Toledo, Ohio) of National Lead Co., is trying to sell to American Motors Corp. for 1963. The 140 hp engine supposedly is a radical enough design to call for $10 million worth of new tooling. It could not be machined on existing AMC engine lines. That is a major point against its adoption.

On the other hand, AMC has had few problems with the present in-line, aluminum six that Doehler-Jarvis designed. It has sold its old gray iron foundry in Kenosha, Wis., and this year will have to buy castings outside. In addition, Ramblers have a front end weight problem which could be lessened by using lightweight aluminum blocks. With no major body shell changes programed for 1963, it may be that AMC will want another engine so it will have something new to merchandise that year.

• **Transmissions Shift**—For a long time, the feeling has been growing that most car buyers don't know what kind of automatic transmissions are at work in their cars' drive trains. The question is asked: Since the transmission has little or no effect on whether or not a person buys a car, why not standardize on a few basic sizes and types?

Look for GM to standardize on a two, three, and four speed torque converter for all divisions except Chevrolet. By 1963, Chevrolet reportedly will settle on the newly designed Powerglide transmission it's introducing this year for standard cars. Ford and Chrysler seem to be heading in the same direction.



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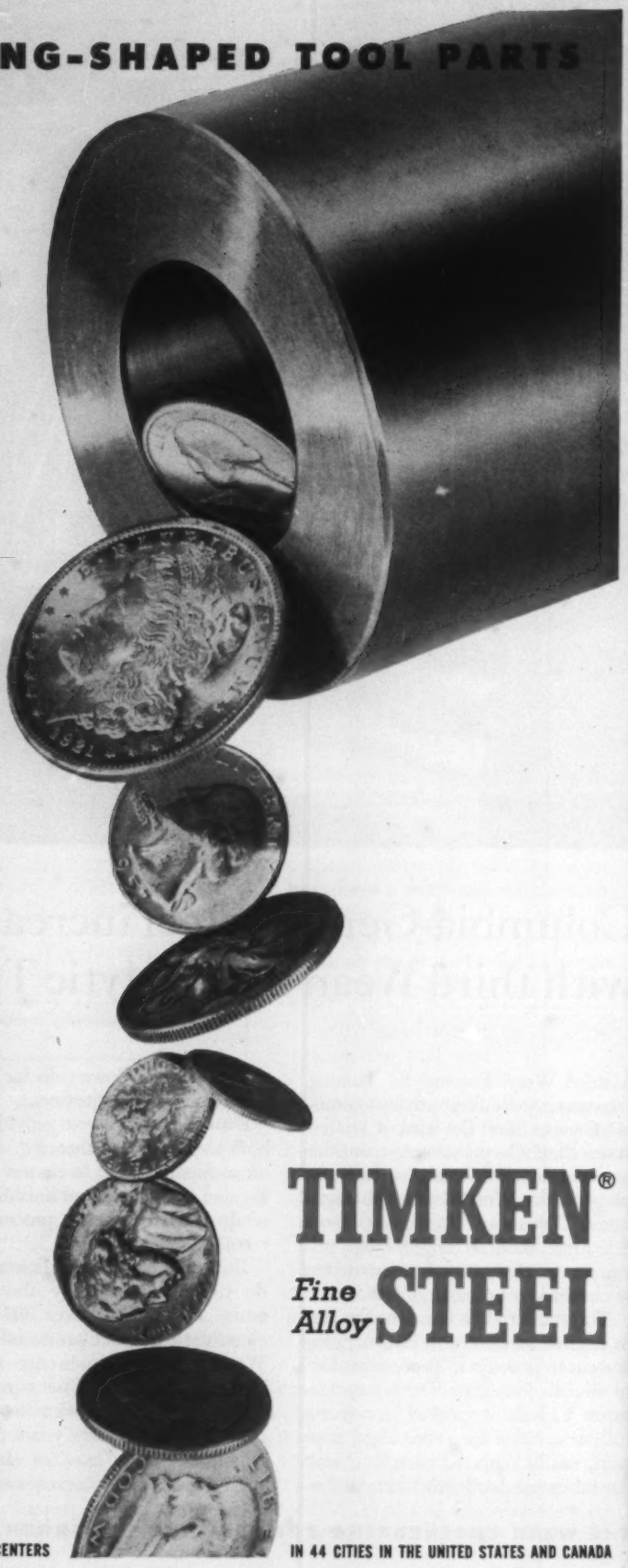

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Economy Sets Record; Durables Lag

THE SPEED and extent of the over-all economic recovery is being revealed almost daily as greater than even the most vocal optimists had predicted. And many metalworking managers continue to wonder when they are going to catch up with the trend.

• **Recovery to Growth** — The 2 point rise in the Federal Reserve Board's industrial production index to a seasonally adjusted 112 (1957 = 100) for July (see graph and table, Page 60) caught some observers by surprise. Those who expected any increase thought it would be no more than a point. Theoretically, that puts total industrial output at an all-time high, exceeding the previous peak of 111 attained in January, 1960. It also marks the fastest recovery in the history of the FRB index—five months. It took 11 months following the 1948-49 recession; 13 months after the slump in 1953-54; and 11 months after the 1958-59 setback. (It should be noted that considerably less ground had to be regained after the 1960-61 dip.)

The official estimate for gross national product (GNP) in the second quarter has been set at $516 billion (annual rate, seasonally adjusted), putting that catchall indicator also at an all-time high. Again, the turnabout was the fastest of the four postwar recessions.

• **Where Is It?**—That's the question being asked by many metalworkers. Says one official of a cutting tool firm: "When I got back from vacation, I was surprised at the amount of improvement in orders. But a record level? Far from it." A partmaker observes: "We've had the usual pickup associated with new model auto production, but our business isn't at the best summer level in our history."

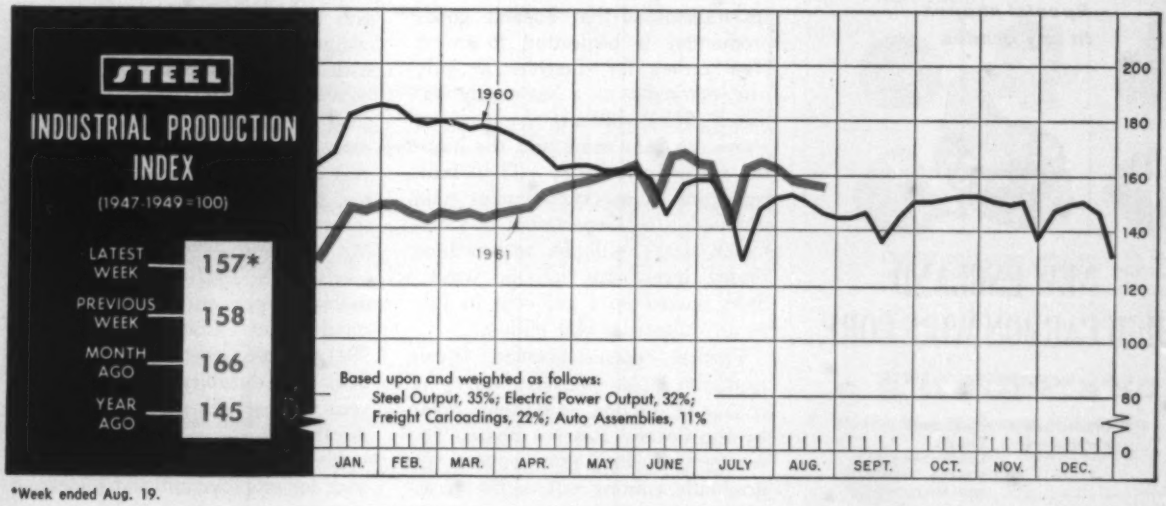
Not only are the metalworkers mystified, but merchants also look at the records with some doubt. Retail sales have been nothing to shout about until the last few weeks. Department of Commerce figures for July showed retail sales at a seasonally adjusted $18.1 billion, down $200 million from the June total. That's only $300 million above the level of February, low month of the recession.

• **Clues in FRB**—Part of the mystery can be solved if you break down the totals of the record-indicating barometers. For instance, the following tabulation of the FRB index (seasonally adjusted), comparing the previous record month with the new one, shows that strength in nondurables and utilities more than makes up the deficits of some metalworking groups:

	July, 1961	January, 1960
	(1957 = 100)	
Total Manufacturing	113	112
Durables Manufacturing	108	111
Primary Metals	96	115
Fabricated Metal Products	110	109
Machinery	110	110
Transportation Equipment	103	108
Instruments	120	118
Nondurables Manufacturing	119	113
Mining	99	98
Utilities	132	120

Paradoxical as it may seem, it has been the hard goods sectors which have accounted for a good part of the speed of recovery. From June to July, the durables category advanced from 105.1 to 108, while nondurables advanced from 117.6 to 118.8. In addition, if you approach the total index from the market grouping angle, you find that production of industrial and commercial machinery moved up about 2 per cent while consumer staples (foods, beverages, drugs) moved up less than 1 per cent.

• **Clues in GNP**—As for gross national product, one of the weaker elements productionwise—passenger



*Week ended Aug. 19.

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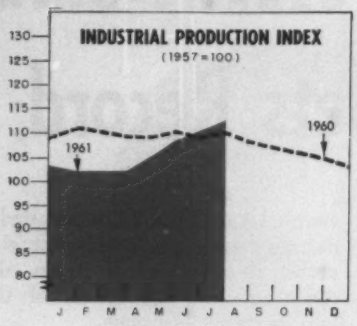
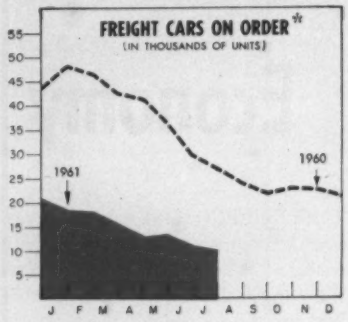




(Seasonally adjusted)

	Total Production 1961	Total Production 1960	Total Mfg. 1961	Total Mfg. 1960	Durables Mfg. 1961	Durables Mfg. 1960
Jan.	102	111	101	112	95	111
Feb.	102	110	101	110	94	109
Mar.	102	109	102	110	95	108
Apr.	105	109	105	109	99	106
May	108	110	108	110	103	107
June	110	109	110	110	105	105
July	112*	110	113*	110	108*	106
Aug.	...	108	...	108	...	104
Sept.	...	107	...	107	...	102
Oct.	...	106	...	106	...	101
Nov.	...	105	...	104	...	98
Dec.	...	103	...	103	...	96
Avg	...	108	...	108	...	104

Federal Reserve Board. *Preliminary.
Charts copyright, 1961, STEEL.

	Domestic Awards 1961	Domestic Awards 1960	Backlogs (end of month) 1961	Backlogs (end of month) 1960
Jan.	1,339	5,742	18,894	48,170
Feb.	1,536	3,211	18,429	45,323
Mar.	1,796	1,957	15,801	42,131
Apr.	2,040	5,352	13,658	41,003
May	3,666	2,285	13,964	36,106
June	1,214	316	11,821	29,555
July	2,425	1,331	10,644	26,658
Aug.	....	1,333	.....	23,866
Sept.	....	2,206	.....	21,662
Oct.	....	5,864	.....	22,900
Nov.	....	3,740	.....	22,781
Dec.	....	2,705	.....	21,070
Total	....	36,368		

*Domestic only.
American Railway Car Institute.

cars—accounted for nearly half of the rise in the second quarter. A sharp rise in the rate of production in the second quarter vs. the first played an important part in reversing the inventory trend from decumulation to accumulation. That, plus an upturn in residential construction, upped domestic investment outlays about 15 per cent.

Other important factors in the GNP record advance were the continued growth in spending for government and services.

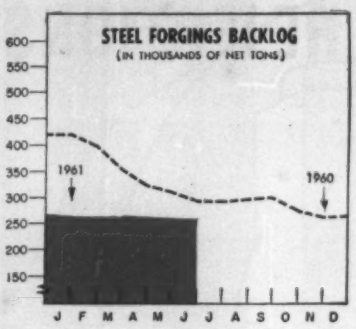
• **Beginning to Move**—But there are indications that durable goods production is beginning to move. New orders for durables in July rose markedly to a seasonally adjusted $15.2 billion, 2 per cent above the June mark and the highest since July, 1959. That indicates that sales (synonymous with production in Department of Commerce data) will be approaching record levels this fall or winter. Sales moved up 1 per cent in July to an adjusted $14.9 billion.

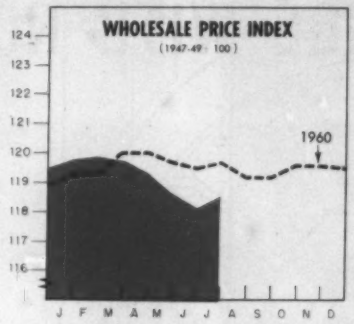
Further encouragement comes from the latest quarterly survey of consumer buying intentions made by the Federal Reserve Board. The survey indicates that buyers are gradually coming out of the recession psychology. They intend to buy more automobiles now than a year ago, but are still hesitant about home and household durable goods purchases when compared with July, 1960. However, in almost all cases, some improvement over the April findings was indicated.

Proving Black Is White

Some economists contend that durables goods are losing ground to nondurables. James M. Dawson, vice president and economist for National City Bank of Cleveland, says it depends on what years you compare. If you compare today with 1957, it appears to be true, because 1953-57 were unusually good years for durables production—the Korean War, the record auto year of 1955, and the capital spending boom all were crowded into that short period. But, suggests Mr. Dawson: "Compare current levels with 1947-49 and durables are up 70 per cent as against 65 for nondurables. Compare with 1935-39 (a former base for the FRB index) and durables are up 278 per cent against 171 per cent for nondurables."

He states that similar comparisons for employment and allocation





	Shipments		Unfilled Orders	
	1961	1960	1961	1960
Jan.	95	123	266	420
Feb.	89	130	263	398
Mar.	96	138	262	356
Apr.	96	117	264	325
May	105	110	262	312
June	108	110	259	295
July	...	79	...	295
Aug.	...	88	...	299
Sept.	...	94	...	302
Oct.	...	97	...	277
Nov.	...	93	...	265
Dec.	...	90	...	268

U. S. Bureau of the Census. Data based on reports from commercial and captive forge shops with monthly shipments of 50 tons or more.

	All Commodities		Other Than Farm & Foods	
	1961	1960	1961	1960
Jan.	119.8	119.3	128.0	128.8
Feb.	119.9	119.3	128.0	128.7
Mar.	119.8	120.0	128.1	128.6
Apr.	119.4	120.0	128.0	128.7
May	118.7	119.7	127.6	128.2
June	118.2	119.5	127.4	128.2
July	118.6	119.7	....	128.2
Aug.	....	119.2	....	128.2
Sept.	....	119.2	....	127.9
Oct.	....	119.6	....	128.0
Nov.	....	119.6	....	127.9
Dec.	....	119.5	....	127.9

U. S. Bureau of Labor Statistics.

of consumer spending give the same results. But he concludes: "The lull in durables which characterized the last half of the 1950s should give way to renewed growth in the years to come. A rising trend of family formations will stimulate production of houses, cars, appliances. Defense spending seems destined to rise. Capital spending starts the decade at a conservative level."

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)	1,980[1]	1,944	1,558
Electric Power Distributed (million kw-hr)	15,900[1]	16,080	15,037
Bituminous Coal Output (1000 tons)	8,215[1]	7,925	8,080
Crude Oil Production (daily avg—1000 bbl)	7,050[1]	7,045	6,842
Construction Volume (*ENR*—millions)	$479.0	$557.3	$455.1
Auto, Truck Output—U. S., Canada (*Ward's*)	21,599[1]	28,087	71,618
TRADE			
Freight Carloadings (1000 cars)	600[1]	591	596
Intercity Truck Tonnage (changes from year ago)	+4%	+3%	−3.8%
Business Failures (Dun & Bradstreet)	343	406	308
Currency in Circulation (millions)[2]	$32,664	$32,564	$32,184
Dept. Store Sales (changes from year ago)[2]	0%	+3%	−1%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$27,455	$26,660	$27,860
Federal Gross Debt (billions)	$292.3	$292.0	$287.8
Bond Volume, NYSE (millions)	$26.5	$30.6	$23.9
Stocks Sales, NYSE (thousands of shares)	18,024	18,163	13,703
Loans & Investments (billions, adjusted)[3]	$114.0	$114.9	$104.7
U. S. Govt. Obligations Held (billions)[3]	$33.3	$33.8	$26.9
PRICES			
STEEL's Finished Steel Price Index[4]	247.82	247.82	247.82
STEEL's Nonferrous Metal Price Index[5]	226.1	225.8	229.6
All Commodities[6]	118.9	118.8	119.3
Commodities Other than Farm & Foods[6]	127.4	127.5	128.3

*Dates on request. [1]Preliminary. [2]Federal Reserve Board. [3]Member Banks, Federal Reserve System. [4]1935-39=100. [5]1936-39=100. [6]Bureau of Labor Statistics Index, 1947-49=100.

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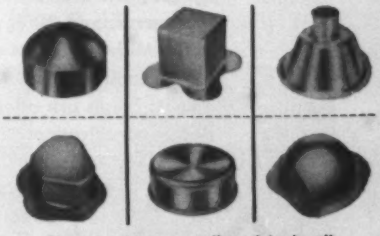

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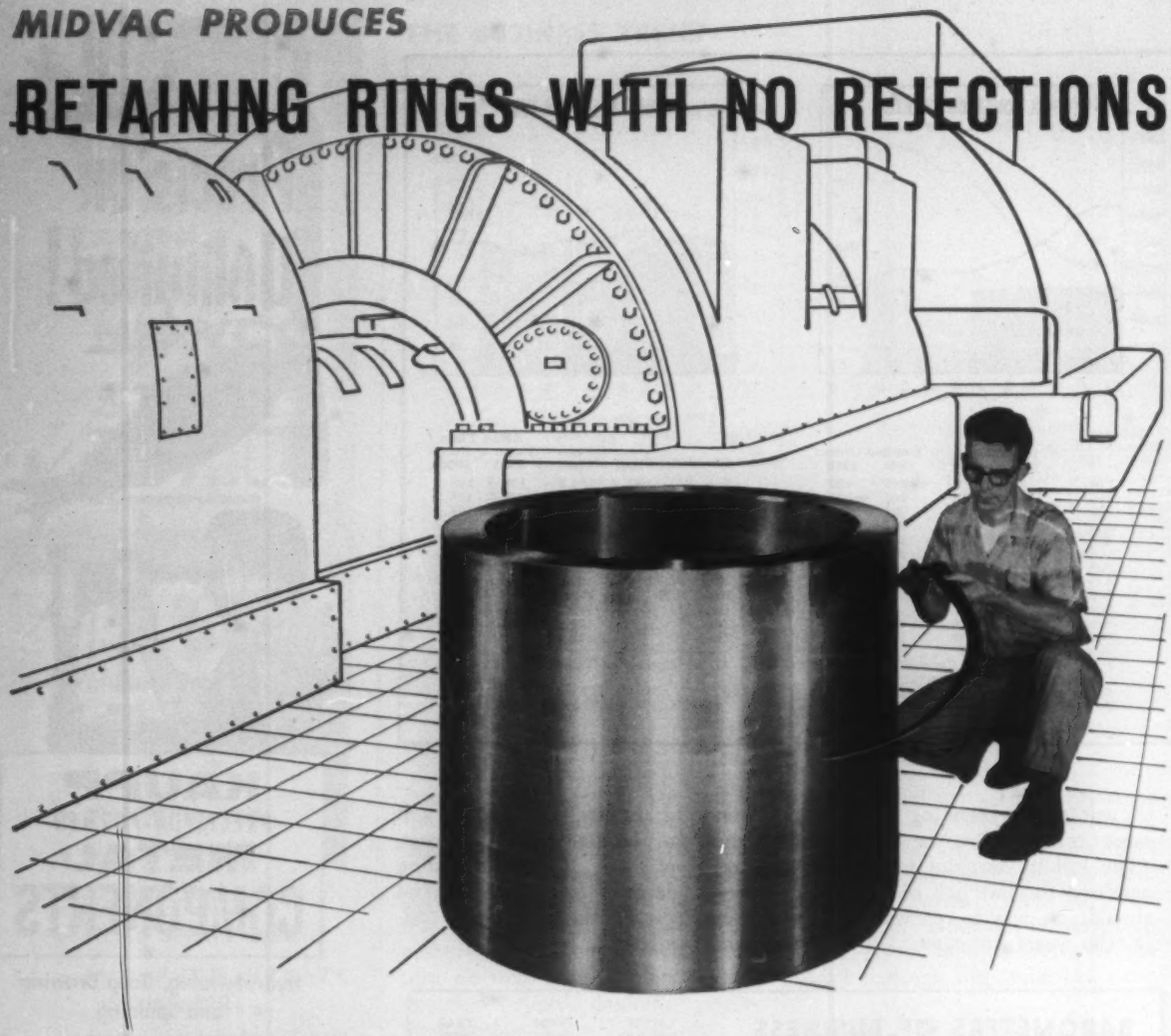
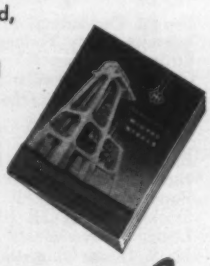


CONSUMABLE ELECTRODE VACUUM MELTED NON-MAGNETIC STEELS ELIMINATE 20% REJECTIONS

Where high tensile and yield strength are required in non-magnetic steel many producers of critical parts are relying on Midvac Steels. In the production of retainer rings for generators, rejects which averaged 20% with air melted steels were eliminated with Midvac vacuum melted steels.

The Midvac Process eliminates atmospheric contamination, ingot soundness is improved, segregation is reduced, workability is increased and product quality is stepped up. Midvac Steels are offered in many alloys as billets or forgings to meet the most critical design specifications. Write for detailed metallurgical case history book to . . .



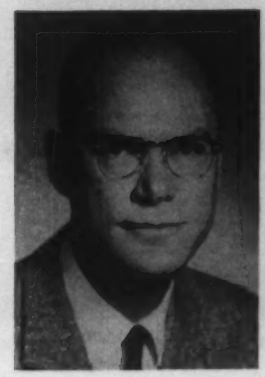
MIDVALE-HEPPENSTALL COMPANY • NICETOWN, PHILADELPHIA, PA.
SUBSIDIARY OF HEPPENSTALL COMPANY, PITTSBURGH, PA.
Plants: Pittsburgh, Pa. • Bridgeport, Conn. • New Brighton, Pa.

H MH *Midvac Steels*

VACUUM AND CONSUMABLE ELECTRODE STEELS • BACK-UP ROLL SLEEVES • FORGED STEEL ROLLS • FORGINGS
RINGS • PRESSURE VESSELS • INDUSTRIAL KNIVES • DIE BLOCKS • MATERIALS HANDLING EQUIPMENT

HAYWARD F. YORK
Chrysler mfg. eng. mgr.

WALTER G. HARGESHEIMER
Kilsby-Tubesupply gen. mgr.



GEORGE C. DAVIS JR.
Kaiser Refractories post

RICHARD S. SHEETZ
Ohio Crankshaft exec.

Chrysler Corp., Detroit, appointed **Hayward F. York** manager of manufacturing engineering. Former chief production engineer, he will be responsible for corporate staff activities related to production engineering, plant engineering, nonproductive standards, and facility analysis activities.

Walter G. Hargesheimer has been named general manager of **Kilsby-Tubesupply**, Los Angeles. He was manager of its Seattle division.

American-Standard Controls Div., Detroit, American Radiator & Standard Sanitary Corp., promoted **Sylvan E. Leinwand** to product planning manager-electromechanical devices; and **Joseph F. Page** to sales manager for TyniSwitch products succeeding Mr. Leinwand.

Dr. Lester C. Van Atta was named technical director of **Hughes Aircraft Co.'s** research laboratories at Malibu, Calif. He was a special assistant in the office of the secretary of defense.

George C. Davis Jr., was appointed to the new position of director of technical planning of **Kaiser Refractories**, Oakland, Calif., a division of Kaiser Aluminum & Chemical Corp. Replacing him as director of technical services is **Russell E. Pardee.**

Charles W. Brunstetter was made general manager of **Ipsen Industries Inc.**, Rockford, Ill. He was manager, Refractory Metals Div.

E. J. Loviner was made manager of the Detroit office of **Cincinnati Milling & Grinding Machines Inc.** He succeeds **Joseph P. Baldez**, who moves to Washington on special assignment, and will be corporate representative.

Frank S. Napoli was promoted from plant manager to vice president in charge of manufacturing of **Towne Robinson Nut Co.**, Detroit. **Paul De Loe**, formerly vice president-manufacturing, will direct research and development in electrical, aircraft, and missile fields.

Richard S. Sheetz joined **Ohio Crankshaft Co.**, Cleveland, as executive vice president. He was manager of the Springfield, Mass., plant of Westinghouse Electric Corp.

Morris W. Reid was made director of marketing, **J. I. Case Co.**, Racine, Wis. He succeeds **A. Earl Lee**, resigned.

J. Thomas Timmins was promoted to president of **Chromium Mining & Smelting Corp.**, Toronto, Ont. He continues as general manager.

Jerome H. Fuchs was appointed executive assistant to **A. S. Basil**, president of **Rockbestos Wire & Cable Co.**, New Haven, Conn., division of Cerro Corp. He will co-ordinate internal operations of the New Haven plant.

Dana Corp., Toledo, Ohio, promoted **W. H. Schomburg Jr.** to general sales manager. Succeeding him as assistant general sales manager is **John P. Henson**, formerly sales

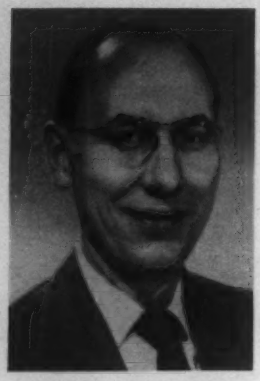
DR. LESTER C. VAN ATTA
Hughes Aircraft tech. dir.

FRANK S. NAPOLI
Towne Robinson Nut post

JEROME H. FUCHS
Rockbestos Wire post

W. H. SCHOMBURG JR.
Dana gen. sales mgr.

ALVIN C. APPEL
American Tool Wks. post



PAUL R. GOUDY
Electric Controller mgr.

L. WILLIAM BACHE
Great Lakes Steel post

JOHN C. HANSEN
Bliss & Laughlin mill mgr.

manager of Dana's Universal Joint Div.

Alvin C. Appel was promoted from plant engineer to works manager at the **American Tool Works Co.**, Cincinnati.

A. R. Gaus was appointed executive vice president, **Reduction & Refining Co. Inc.**, Kenilworth, N. J., recently acquired subsidiary of P. R. Mallory & Co. Inc. **Stuart Lasdon** was made vice president-production; **Lloyd Lasdon** vice president-sales and development.

John R. Wanzeck was named production control manager in the Clinton, Mich., plant of **Clinton Engines Corp. Arthur E. Smith** was named merchandising manager for the firm.

Howard Goodman succeeds **William E. Goodman**, retired, as chairman, **Goodman Mfg. Co.**, Chicago, and continues as president and chief executive officer. **John S. Newton** has been named executive vice-president.

Paul R. Goudy has been made manager of **Square D Co.'s** Electric Controller & Mfg. Div. in Cleveland, succeeding **Wilbur H. Peter Jr.**, resigned. He was chief engineer of the Industrial Controller Div. in Milwaukee and is succeeded by **Robert C. Mierendorf.**

L. William Bache was appointed assistant to the president of **Great Lakes Steel Corp.**, Detroit, subsidiary of National Steel Corp. He was assistant treasurer.

Allwyn B. Williamson was named vice president and general manager, **McGill Mfg. Co.'s** Bearing Div., Valparaiso, Ind.

William E. Van Horn was made hydraulic division sales manager, **Gar Wood Industries Inc.**, Wayne, Mich.

Towmotor Corp., Cleveland, elected **Galen Miller** president, succeeding **C. Edgar Smith**, named chairman of the executive committee. **Robert L. Fairbank** becomes executive vice president.

John C. Hansen was named manager of the steel mill **Bliss & Laughlin Inc.** is constructing in Medina, Ohio. He was production manager of the Buffalo mill.

Robert E. Gengenbach was elected vice president and general manager, SBB Div., **Miniature Precision Bearings Inc.**, Keene, N. H. **Donald D. Davis** was elected vice president, secretary-treasurer. **A. van Breems** was elected vice president-director of international operations.

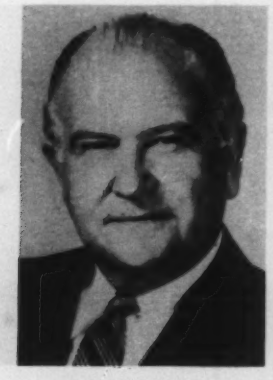
Soule Steel Co., San Francisco, named **Stanley W. Nightingale** to the new post of general manager, Steel Structures Div. Former general sales manager of the division, he is succeeded by **James Kendall. Roger Chung** was named assistant general manager, and **LeRoy Elmburg** general operations manager of the division.

Paul F. Allmendinger has been named director of engineering for **Electric Autolite Co.'s** electrical products group, Toledo, Ohio. He

HOWARD GOODMAN

JOHN S. NEWTON

Goodman Mfg. executive appointments



GALEN MILLER

ROBERT L. FAIRBANK

Towmotor president, executive v. p.

also co-ordinates and initiates product development.

Robert G. Burson has been appointed director of marketing-industrial products of **Foote Bros. Gear & Machine Corp.**, Chicago. He was vice president of Dayco Corp.

Cleaver-Brooks Co., Milwaukee, changed the name of its Road Machinery Div. to Heater Div., and named **O. E. Jacobsen** general manager and **Walter Schuman** sales manager.

Robert A. Morgan was named manufacturing manager for **Clevite Electronic Components Div.**, Cleveland, Clevite Corp.

Peter M. Maler was made vice president - manufacturing for **Astron Corp.**, East Newark. N. J., and its subsidiaries, Skottie Electronics Inc. and Minitronics Corp.

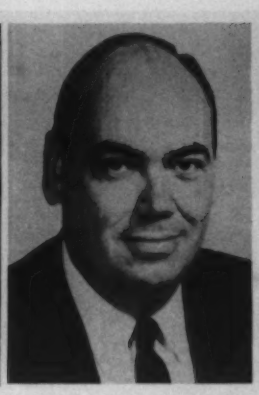
Dean E. Stephan was made managing director of Chicago Bridge Ltd., London, England, subsidiary of **Chicago Bridge & Iron Co.**

Bert G. Thorstenson was appointed sales manager, **Hanchett Magna-Lock Corp.**, Big Rapids, Mich. He was chief engineer, Magnetic Products Div., Sundstrand Corp.

William B. MacKay was appointed director of manufacturing engineering, **Motec Industries Inc.**, Hopkins, Minn.

Republic Steel Corp. named **Edward G. Kondas** general superintendent of its Chicago District steel plant. He has been assistant superintendent of the open hearth department at the company's Cleveland District steel plant.

ROBERT G. BURSON
Foote Bros. marketing dir.



WILLIAM C. McCOSH
Nat'l Carbon marketing dir.

RICHARD M. WINKLER
Susquehanna Sciences post

William C. McCosh has been made director of marketing for **National Carbon Co.**, New York, division of Union Carbide Corp. He succeeds **Curry E. Ford**, now director of development.

E. S. Russey was elected chairman of **Borg-Warner Ltd.**, Letchworth, England. He is vice president of Borg-Warner Corp., Chicago, and president and general manager of Warner Gear Div., Muncie, Ind., and Warner Gear Co. Ltd., Windsor, Ont.

Ralph F. Moore joined **Cameron Mfg. Corp.**, Emporium, Pa., as works manager of its Forging Div. **Bird C. Carson** was made sales manager and controller.

Thomas J. Payne, treasurer, was promoted to a vice president of **J. Bishop & Co.**, Malvern, Pa.

F. W. Sorsensen has been appointed manufacturing manager at the Traverse City, Mich., plant of **Cone-Drive Gears Div.**, Michigan Tool Co. He was plant superintendent.

Susquehanna Sciences Inc., Los Angeles, appointed **Richard M. Winkler** director of customer relations. Former sales manager for Coleman Electronics, he will direct the sales activities of the firm's two affiliates, Computer Engineering Associates and Birdsell Products.

At **U. S. Steel Corp.'s** Gary, Ind., Sheet & Tin Mill, **Earl D. Spangler** was named assistant to the general superintendent. He is succeeded by **Rolf C. Haab** as Tin Mill Div. superintendent.

Nicholas E. Rothenthaler was named general manufacturing manager, Steel Div., **Ford Motor Co.**, Detroit. He is succeeded by **James C. Pittinger** as operations manager, blast furnaces and coke ovens. **Kenneth G. Larsen** succeeds Mr. Pittinger as general superintendent, coke ovens.

John H. Parker was named sales development manager, Power Tool Div., Pittsburgh, **Rockwell Mfg. Co.**

Stanley N. Johnson was elected executive vice president, **Lansing Stamping Co.**, Lansing, Mich.

EDWARD G. KONDAS
Republic steel plant supt.

THOMAS J. PAYNE
J. Bishop & Co. v. p.

F. W. SORENSEN
Cone-Drive Gears post

OBITUARIES...

A. J. Fisher Jr., 47, executive vice president, **Metal & Thermit Corp.**, New York, died Aug. 11.

Alfred B. Hennessy Jr., 52, Chicago district sales manager, **Summerill Tubing Co.**, died Aug. 13.

Clarence G. Millner, 52, president, **Progressive Foundries Inc.**, Lakeville, N. Y., died Aug. 12.

This galvanizing line and other facilities unveiled as . . .

Youngstown Sheet & Tube Expands Facilities at Indiana Harbor

YOUNGSTOWN Sheet & Tube Co. has taken the wraps from new production facilities completed this year at its Indiana Harbor Works, East Chicago, Ind. Included are a hot dip galvanizing line; a second, continuous strip, annealing line; a high speed, six stand, cold reduction mill; an 87 oven coke battery; and a 300 ft ore dock extension.

• **Galvanizing Line**—The firm reenters the galvanized sheet market from which it withdrew in 1941. The new facility (865 ft long) produces coils and cut sheets under the brand-name Tufkote. Capable of producing 6 ft diameter coils weighing 48,000 lb, the line can turn out the zinc coated strip at 400 fpm at thicknesses ranging from 10 to 30 gage. Coil widths range from 20 to 60 in. For cut lengths (4 to 22 ft), the strip bypasses the coiler. The Sendzimir process is employed in the line.

• **Cold Reduction Mill** — The six stand mill rolls tin plate strip at a maximum speed of 7250 fpm. It can be brought up to maximum in 14 seconds and stopped in 7 seconds (STEEL, May 22, p. 126). The mill, supplied by Mesta Machine Co., Pittsburgh, has six stands of rolls in tandem instead of the conventional four and five stands. Coils weighing up to 62,100 lb and stretching for 30 miles can be handled. Strip measures 22 to 46 in. wide while coils range from 30 to 80 in. in diameter.

The mill is equipped with transistorized, automatic, data logging equipment to record a complete history of each coil as it is rolled. Gage control is more nearly uniform.

The mill is housed in a new building 615 ft long and 125 ft wide, attached to the No. 2 Tin Mill. Two auxiliary buildings provide coil storage space.

• **Annealing Line**—The continuous annealing line is the second installed as part of the firm's tin plate expansion program at its No. 2 Tin Mill. The new unit is 560 ft long, including the annealing furnace (115 ft long and 70 ft high). A closed circuit television system with four cameras allows operators to keep tab on the steel in each section of the gas fired furnace. The line is designed to continuously anneal the steel at a rate of 2000 fpm.

After cleaning and annealing, the strip is flattened by the high speed temper mill which also imparts specified finishes and hardness. After coating in the electrolytic tinning line, it is shipped to customers in sheets and coils.

Sibley Machine Installing Tagliaferri Mixer Furnace

Sibley Machine & Foundry Co., South Bend, Ind., has purchased a 4 ton, Tagliaferri receiver and mixer furnace from Hevi-Duty Electric Co., a division of Basic Products Corp., Milwaukee. Hevi-Duty is introducing to the U. S. and Canadian markets this new line of low frequency induction melting and receiving furnaces under a licensing agreement with Forni Elettrici A. Tagliaferri, Milan, Italy (STEEL, Nov. 21, 1960, p. 112). The equipment will be manufactured in Hevi-Duty's main plant in Watertown, Wis.

With the new induction systems, the company claims it is possible to increase the strength of cast iron as much as 20 per cent and reduce production costs. Both ferrous and nonferrous furnaces will process borings, chips, and scrap into high quality castings. Changes in the analysis of molten irons can be made in the mixer unit with virtually no loss through use of a unique controlled stirring action, says E. E. Staples, Hevi-Duty president.

Firms Change Designations

Glidden Co., Cleveland, changed the name of its Paint Div. to the Coatings & Resins Div.

Air Products Inc., Allentown, Pa., changed its name to Air Products & Chemicals Inc. It also acquired Southern Oxygen Co., Bladensburg, Md. Southern Oxygen will operate under its own name as a division of Air Products.

Alabama Metal Lath Co. Inc., Birmingham, changed its name to Alabama Metal Industries Corp. The company is erecting an addition to its plant and will manufac-

ture industrial and decorative expanded metal, beginning in early 1962. The company makes metal lath, interior structural members, and roof drainage products.

Rolling Mills Inc. Formed

Rolling Mills Inc., 3522 James St., Syracuse 6, N. Y., has been organized to design and manufacture steel mill equipment, metal forming machinery, and complete processing lines. The firm will be in a position soon to supply spiral corrugated and spiral welded pipe machinery. John W. Sprow is president.

Argentine Mill Planned

Donovan Iron & Wire Co., Toledo, Ohio, has applied for permission from the Argentine government to build a $100 million steel rolling mill in that country. Products would include hot and cold rolled strip, tin plate, and plates. Capital would come from individuals in Argentina and Donovan Iron.

Reynolds Enlarges Plant

Reynolds Metals Co., Richmond, Va., is increasing the capacity of its aluminum foil printing at Bellwood, Va., by 50 per cent. The project includes a 70,000 sq ft plant addition and installation of three additional presses for printing foil packaging materials of all types. The plant will have a total of nine presses with a daily capacity to print more than 600 miles of foil.

Carborundum Co. Expands

Carborundum Co. has launched a $1.5 million modernization and expansion of its Globar Electronics plant on Hyde Park Boulevard, Niagara Falls, N. Y. This is part of the firm's $45 million, six year, capital expenditure program announced in 1958. The Globar Electronics plant is a branch of Carborundum's Refractories Div.

Casting Firm Builds

Sawbrook Steel Castings Co., Cincinnati, is building a $600,000, 23,000 sq ft addition to its plant. Equipment in the new section will include a new 10 ton crane and a new, 2 ton, top charge, electric furnace.

J&L Places Mill Contract

Jones & Laughlin Steel Corp., Pittsburgh, has awarded contracts for a cold reducing mill that produces double reduced tin plate to the E. W. Bliss Co., Salem, Ohio. The mill is designed to process electrolytic tin plate into thin tin plate. The unit is scheduled for operation in eight months and is part of a $12 million capital expenditure program for thin tin plate facilities. The two stand, four high mill will handle coils up to 42 in. wide that weigh as much as 45,000 lb.

CONSOLIDATIONS

Falconbridge Nickel Mines Ltd. and **Ventures Ltd.**, Toronto, Ont., will merge, subject to approval of shareholders.

Fulton Industries Inc., Atlanta, acquired **Dollin Corp.**, Irvington, N. J., producer of aluminum and zinc diecastings. Dollin will operate as a division of Precision Castings Co., Cleveland.

Penn Controls Inc., Goshen, Ind., will acquire **Baso Inc.**, Milwaukee, subject to approval of stockholders. Baso makes automatic controls, switches, and valves for gas burning devices.

Instrument Systems Corp., College Point, N. Y., acquired **Cornwell Electronics Corp.**, Byram, Conn., producer of power control, saturable core reactors; special transformers; and magnetic amplifiers.

New York Air Brake Co., New York, purchased **B-I-F Industries**, Providence, R. I., a leader in automatic flow control, measurement, and weighing of gases, liquids, and solids.

Beckman Instruments Inc., Fullerton, Calif., acquired **Offner Electronics Inc.**, Schiller Park, Ill., and will operate it as a division.

A. R. Gieringer Tool Corp. purchased **Midwest Tool & Die Co.**, both of Milwaukee.

Voi-Shan Industries Inc., Los Angeles, bought **D-M-E Corp.**, Detroit, and will operate it as a subsidiary. The Detroit firm is a supplier of standard mold bases and moldmakers' supplies for the diecasting and plastic molding industries.

Reynolds Metals Co., Richmond, Va., and **Tilo Roofing Co. Inc.**, Stratford, Conn., will merge, subject to approval of shareholders.

ASSOCIATIONS

Eastern States Blast Furnace & Coke Oven Association, Pittsburgh, elected these officers: President, W. H. Holman, Wheeling Steel Corp., Wheeling, W. Va.; vice president, P. J. Bornhorst, Clairton (Pa.) Works, U. S. Steel Corp.; and secretary-treasurer, C. T. Marshall, Pittsburgh Coke & Chemical Co., Pittsburgh.

NEW PLANTS

F. J. Stokes Corp., Philadelphia, opened a facility at 3761 E. Colorado Blvd., Pasadena, Calif., to handle its equipment for vacuum processing, molding, tableting, and compacting.

Met-L-Rol Corp. opened a 20,000 sq ft plant in Hialeah, Fla., for the manufacture of form rolling machines, roller dies, and roll feed and leveler units. Carl N. Hazlewood is president.

NEW OFFICES

Harbison-Walker Refractories Co., Pittsburgh, will open a district office in Charlotte, N. C., on Sept. 1. L. M. Allen is district sales manager.

Huck Mfg. Co. (precision fasteners and fastening tools) opened these regional offices: 576 Armour Circle, Atlanta, W. W. Hunt, manager; 400 Delancy St., Newark, N. J., A. J. Upton, manager; 7452 N. Harlem Ave., Chicago, A. R. Tenny, manager; and 7849 N. Lindbergh Blvd., Hazelwood, Mo., R. V. Clute, manager.

M&T spray-on vinyl finish goes where the wear is

Two major advantages work for any user of M&T spray-on vinyl finishes. They explain the increasing application of these finishes to automotive interiors such as this station wagon deck as well as appliances, business machines, metal cabinets and instruments.

First is a service benefit. M&T spray-on vinyls are so resistant to abrasion, they outwear ordinary textured enamels by as much as 10 to 1. They also resist stains, scuffing, gouges and cuts. Products that take hard wear look better longer with such a finish.

Second big advantage is in production. These finishes provide a distinctive texture via the *spray gun*. On smooth metal, they can be chemically textured to afford a rich, leatherlike appearance. Sprayed on patterned metal, they "mirror" the pattern with high fidelity even when applied in thicknesses up to 15 mils.

Since the coating is applied to the finished part, it simplifies welding or forming, covers any complex shape, and leaves no raw edges to rust. Rejects are easily stripped and scrap metal is uncoated, for higher scrap value.

M&T has newly enlarged plants to deliver the known quality of vinyl coatings in quantity, in colors specified, on schedule. Plastisol coatings are also produced for heavy duty, industrial protective coating applications. Send for details on M&T Spray-On Vinyls, or for an M&T coating specialist to study your requirements and advise you.

M&T

coatings · chemicals · minerals · detinning
plating products · welding products

METAL & THERMIT CORPORATION, General Offices: Rahway, New Jersey
In Canada: M & T Products of Canada Ltd., Rexdale, Ontario

EXPLOSIVE DIAMOND DUST—Graphite placed over a container of water can be compressed by an explosive shock of 300,000 atmospheres for a microsecond. Result: Some diamond dust (particles up to 40 microns). That's what scientists at Stanford Research Institute, Menlo Park, Calif., claim. Their results have been checked by the University of Chicago.

ZINC PROTECTS HOT COLUMBIUM—Coatings of 0.006 in. zinc protect columbium for 1000 hours at 1800° F, 70 hours at 2000° F, states W. D. Klopp and C. A. Krier, Battelle Memorial Institute, Columbus, Ohio. The film exhibits remarkable healing effects when damaged. Coating may be applied by electroplating, cladding, or hot dipping.

MORE ON COLUMBIUM—Two alloys (Fansteel's CT2WZ and Haynes Stellite's Cb-74) have been recommended for development under the Navy program for rolling refractory metal sheets, says Battelle Memorial Institute, Columbus, Ohio.

BEARING WEAR STUDIED—Radioactive rollers are being employed to improve lubrication and race design, says SKF Industries Inc., Philadelphia. The firm says results are already being incorporated in new products.

LAMP LIFE 20 TIMES LONGER—A new type of electroluminescent bulb produced and designed for subways by the Electron Tube Div., Lancaster, Pa., Radio Corp. of America, is expected to operate continuously for five years. Cost: $23.60, but added life will result in a $20 saving, the firm claims. Electricity to light the new bulbs costs 20 cents annually vs. $6 for the incandescent type.

NAVY ADAPTS TACHOMETER—By employing the same principle (an interrupted light beam) used in large electric drives, Navy scientists have greatly increased the accuracy of wind tunnel tachometers. A disc with holes is attached to a spinning wind tunnel model. A light beam passing through the holes intermittently energizes a photoelectric cell. Counting the pulses electrically accurately gives rpm.

ATOMIC DIP STICK—Radioactive sources can be more accurate than conventional devices in measuring fuel, claims Atomics International Div., Canoga Park, Calif., North American Aviation Inc. Such a device will be employed in measuring propellent in fuel tanks of rocket engines made by that firm's Space Systems Div. Accuracy: Within 2 per cent.

INCONEL 718 FORGED—Wyman-Gordon Co., Worcester, Mass., says Inconel 718 can be worked in closed dies. Forgeability is reported similar to that of A-286 and other alloys intended for 1300° F applications.

FAST, THREE COLOR PYROMETER— The National Bureau of Standards, Washington, has developed a pyrometer that makes accurate temperature measurements (1800 to 5432° F) 1000 times a second. It eliminates many of the limitations of two color types, claims the bureau, and will be especially useful in measuring rapidly changing temperatures.

HARDENS LEAD— Lithium is being studied as a hardener for lead. Such alloys (1 to 3 per cent lithium) have been employed in Germany for bearings, printing type, and stereotype metal, says Foote Mineral Co., Philadelphia. The material would be helpful as a reactor shield. Ample domestic capacity for lithium is one reason for the interest, say experts.

DANGER IN ULTRASONIC WAVES—Prolonged exposure to ultrasonic waves and high frequency devices has marked physical effects on workers, claims *Hygiene & Sanitation*, a Soviet medical journal. "Inaudible waves disturb the organs of hearing, the nervous, and endocrine systems," it states. Other general effects noted: Hypotension, higher body and skin temperature, slower pulse, reduced blood pressure, fatigue, irritability.

In near surgical environment, operators carve flyweight gyro parts

How AC Spark Plug Machines Beryllium

• MACHINISTS working behind glass panel walls carve precision gyroscope parts from solid beryllium at the Oak Creek Plant (Milwaukee), AC Spark Plug Div., General Motors Corp. They use about 250 lb of the metal each month.

AC turned to the feather-light metal when missilemakers sought lighter, but highly stable, guidance systems. The beryllium machining department at Oak Creek got underway about 18 months ago.

• The totally enclosed machining department takes up 5000 sq ft.

Because beryllium dust is toxic, the whole room is ventilated; each machine has a Plexiglas box surrounding the working area, and a vacuum intake whisks chips away from the cutting tools and grinding wheels.

Four, 25 ton air conditioning units circulate 40,000 cfm of air through a system of supply and return ducts. Diffusers and grilles provide a uniform air temperature. Precise temperature control is obtained by reheat steam coils. A system of cooling coils, followed by heating coils, also controls the relative humidity.

Makeup air is taken from outside and inside the building and is proportioned with a control damper. The amount of makeup air is always

less than the amount removed from the room through the dust collection system. So the room is under a slight vacuum. At all openings, including door locks, air flows into rather than out of the room. That precludes any dust getting out into the other plant areas.

• Chips and dust from each machine are sucked up before they can get into the room atmosphere.

Each machine tool has a plastic hood designed for it; a flexible hose projects through the hood, drawing out the dust and chips generated during machining. On grinding machines, the hoods cover the entire grinding area. They have hinged or sliding doors for operator access to the work.

Dust and chips inhaled by the hoses (they have a capture velocity of about 4500 fpm) go into four, large bag collectors equipped with automatic high pressure reverse jet bag cleaners. To protect the bags, each collector has a skimmer that removes chips.

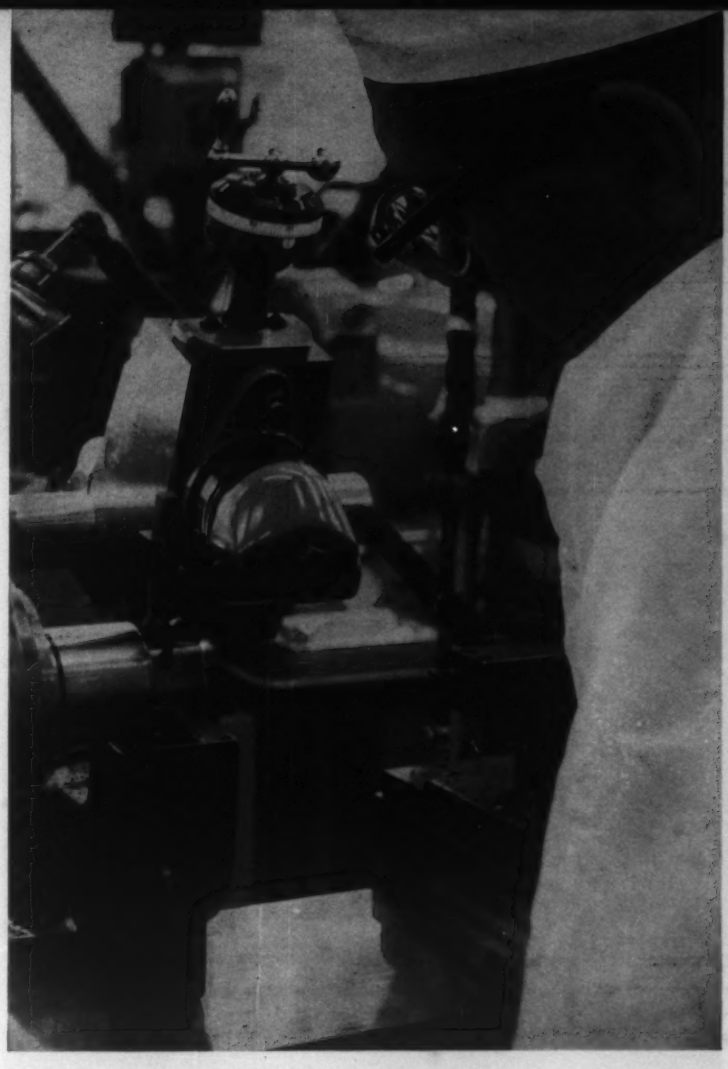
In addition, the department has a central vacuum system with outlets distributed through the department. It is for cleaning machines, floors, and walls.

Operators wear nylon caps and gowns. The clothing is laundered in the department in an automatic washing machine. Wash basins, soap, and paper towels are supplied. Three vacuum shoe cleaners take care of footwear. Operators must remove their caps and gowns, wash their hands, and vacuum their shoes before leaving the department. Every person in the area (only authorized personnel are allowed in) has a physical examination every six months.

• Beryllium machines about like chilled cast iron.

Machinists at AC say beryllium is stable (a must for the microtolerances used in missile gyros), and it conducts heat rapidly.

Above all, they report, the material is highly abrasive and makes tools wear at an extremely high rate. General purpose carbide tools ground to the geometry normally used for cast iron wear rapidly. Slow surface speeds cause the cutting edges to break down; metal tends to build up on the cutting edge; and cratering results.



Turning

Wear resistant grades of carbide are used for all turning cutters. Most turning is done at 800 surface feet a minute (400 sfpm is considered minimum).

Here's the tool geometry that seems to work best: 15 degree side cutting edge angle, 15 degree end cutting edge angle, 15 degree front and side clearance angles, and 15 degree positive back and side rake angles. The nose radius is 0.015 to 0.020 in.

Tools must be rigid. They are reconditioned when wear exceeds 0.003 to 0.005 in. "We found this more economical than to permit the tool to wear beyond the 0.005 in. We thus hold down the diamond wheel replacement costs," says the company.

Lathe cutoff tools also are made of wear resistant carbides; they are ground with a 15 degree positive back rake and front clearance, with 2 degree side clearances. They're run at 600 sfpm, and they are usually 0.040 to 0.060 in. wide.

Most turning cuts produce a surface finish of about 14 microinches rms. The cutoff surface is about 16 microinches rms. Some of the turning tools are mounted so they cut upside down, promoting the flow of chips away from the tool surface.

. . . more tips on machining beryllium

Drilling

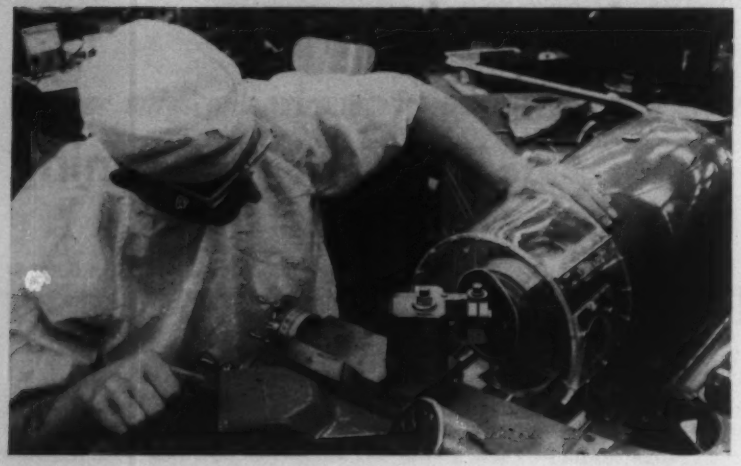
Carbide drills are used whenever possible. AC formerly used high speed steel drills with a 0.001 in. nitrided case. But tests indicate that carbide's longer life will more than offset the additional cost when highly abrasive beryllium is machined.

Recommended: A mechanical feed that can be adjusted for depth control and can be set to retract the drill at specified intervals. Frequent retraction of the drill is considered a must at AC. Each time the drill is brought out of the hole, the flutes are brushed clean and relubricated with an active sulfur base oil. When drill bushings are used, a distance equal to at least one drill diameter is left between the workpiece and the bottom of the bushing. Again, AC spokesmen warn that the tool and bushing must be kept free of chips.

Here's the drill geometry that has worked best: Helix angle, 18 to 20 degrees; minimum point angle, 135 degrees; web thickness, a maximum of one-eighth the drill diameter; margin width, one-eighteenth of drill diameter; primary width, equal the margin width; primary relief angle, 18 to 20 degrees; secondary relief, 35 to 40 degrees; width of the primary angle surface, equal to the margin width.

With that drill geometry and practice, holes are straight; size is accurate; and there's no taper. The hole surface finish is 14 to 18 microinches.

The optimum setup seems to be at 140 sfpm with a 0.002 in. per revolution feed rate.



Boring

At AC, boring is done on chucking lathes, precision boring machines, jig borers, and vertical milling machines. Tool geometry varies with bore size.

Positive back rake angles of 10 to 15 degrees, side rakes of 0 to 5 degrees, clearance angles of 10 degrees, and hose radiuses of 0.008 to 0.030 in. produce good clean high finish bores suitable for lapping.

Threading

Taps are used to cut sizes No. 0-80, 2-56, 3-56, 4-40, 5-40, 6-32, 8-32, 10-32, and 12-72. Larger sizes are single point threaded.

Taps are made of M-2 high speed steel, hardened to 68 Rockwell C and nitrided to a depth of 0.0015 to 0.002 in. Taps with a four thread and a two thread lead for bottoming give the best results on lead screw tappers. Speeds (varied for the size, pitch, and thread depth) run 40 to 90 ft a minute. The lower speeds are for the sizes through 5-40.

Here are the geometries for 0-80 through 5-40: Spiral point has 12 to 15 degree tangential hook. Straight flute, radial to 2 degree hook. Outside diameter is concentric; chamfer angle is 8 to 9 degrees; chamfer length is four threads, with a chamfer relief of 0.006 to 0.008 in. Both the web thickness and land width equal half the tap diameter.

For sizes 6-32 and larger, the outside diameter is concentric, but the chamfer angle can be increased to 25 degrees when bottom tapping. Web thickness is also upped to 2½ times the tap diameter; land width amounts to about 75 per cent of the tap diameter.

Milling

Wear resistant grades of carbides are used for all milling cutters. End mills with a high helix-angle and two flutes are used for profile and duplicator work.

Speeds start at 140 sfpm and are increased in accordance with types of cut and surface finishes required. Minimum feed rates are 3½ in. a minute.

Horizontal milling uses cutters with 4 to 12 teeth. Speed and feed rates are dependent on type of cut and method of holding the workpiece. Somewhat higher rates are used than for vertical milling.

All milling is done without a coolant. Surface finishes of better than 55 microinches rms are possible. Positive rake angles from 8 to 20 degrees are used with 2 degree side clearance and 4 to 12 degree front clearance angle.

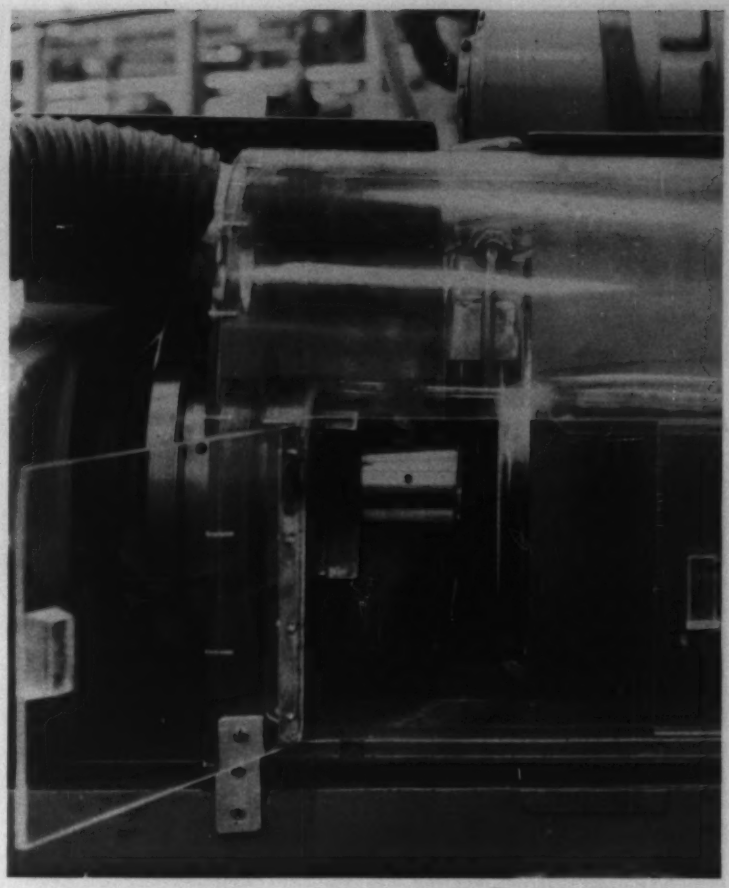
Grinding

First, AC spokesmen say that most grinding can be eliminated by good turning or boring jobs. Proper size control with the cutting tool can make it possible to go right to honing and lapping (when they are required) without the need for grinding.

Aluminum oxide wheels with vitrified bond run at 5000 sfpm, with a water soluble coolant. They grind off 0.005 to 0.008 in. of stock. After that much stock is removed, the wheel must be redressed. That job is accomplished with a good, sharp diamond dresser. Ground finishes average 6 to 8 microinches.

The procedure applies to both internal and external grinding. All coolants are filtered and replaced after 48 hours of grinding time. If coolants are not replaced that often, the workpiece surface finish suffers, says the company.

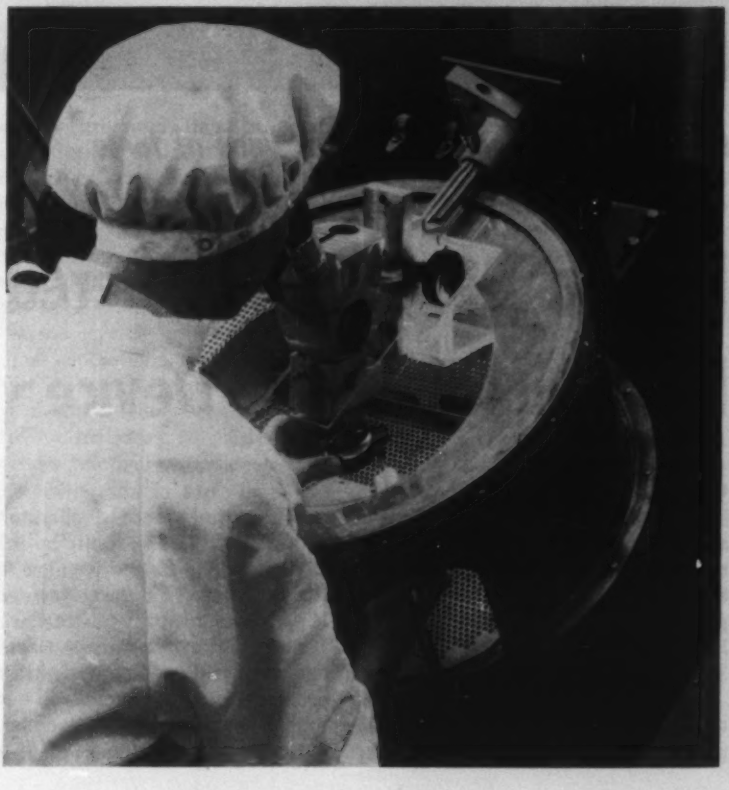
Honing is done on mandrel type machines. Power lapping for straight bores and taper bores is done on machines designed and built at AC.



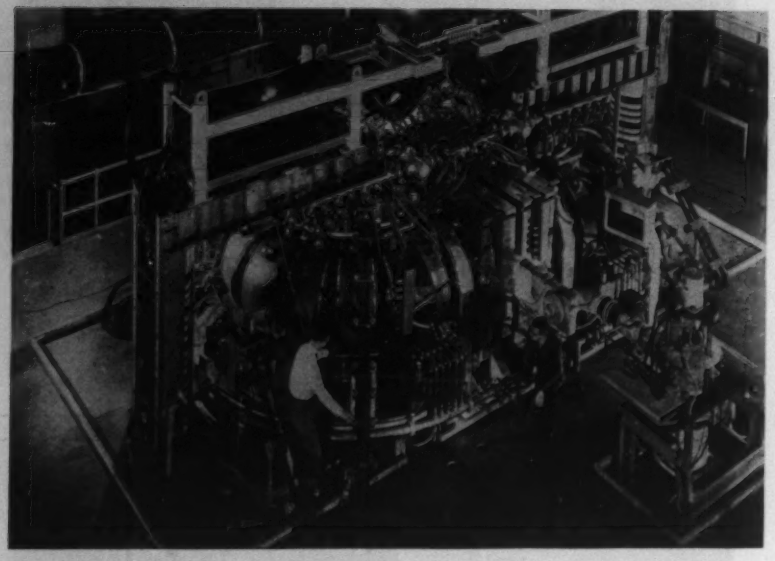
Deburring

Machined beryllium parts are deburred in vibratory tub type tumblers. The media used are granite stones or ceramics mixed with aluminum oxides and water.

Microscopic burrs are removed manually by operators. The parts are viewed through microscopes (30 and 50 power) at enclosed bench stations. Each station has an exhaust drop connected to a manifold for the removal of the small chips and burrs. The stations are enclosed except for hand holes. High speed polishing cables with rubber wheels impregnated with grit, or abrasive cloth assembled to an arbor and driven by the polishing cables, are also used to deburr sharp edges—they're on the edges and corners of grooves, undercuts, and tapped holes. Diamond files, steel wool, steel picks, and fingernail sanding boards are also used for fine deburring.



Big weldment is made of nonmagnetic alloy . . .



It aids in positioning magnetic lines of force

Plasma Research Furthered By Stainless Steel Device

• HIGH STRENGTH, fabricability, and minimum magnetic permeability were prime requirements for material used in a device being built for advanced studies in plasma physics at Princeton University, Princeton, N. J. The choice: Type 305 stainless steel.

About 612,000 lb of the austenitic alloy were used in the supporting structure, vacuum vessel, and coil cases of the unit, which is called the Model C Stellarator.

The unit is being built by Allis-Chalmers Mfg. Co., Milwaukee, and Radio Corp. of America, New York. It was designed by C Stellarator Associates, an engineering group made up of Allis-Chalmers and RCA personnel.

• Rigidity was an important design consideration, but other characteristics of Type 305 made it extremely well suited for the structure.

Specifications called for an underframe with no more than 1/16 in. horizontal deflection under normal service load. Such performance could be expected from the austenitic material, which has an ultimate tensile strength of 80,000 to 90,000 psi and a yield strength of 35,000 to 45,000 psi. The material takes a 50 to 60 per cent elongation under test, and has an Izod impact test value of 70 to 110 ft-lb.

The material has a hardness of 75 to 90 Rockwell B after annealing. It has minimum magnetic permeability and electrical resistivity. It also has a low work hardening rate and good machinability.

• Care in melting, rolling, annealing, and fabrication insures optimum performance of the parts.

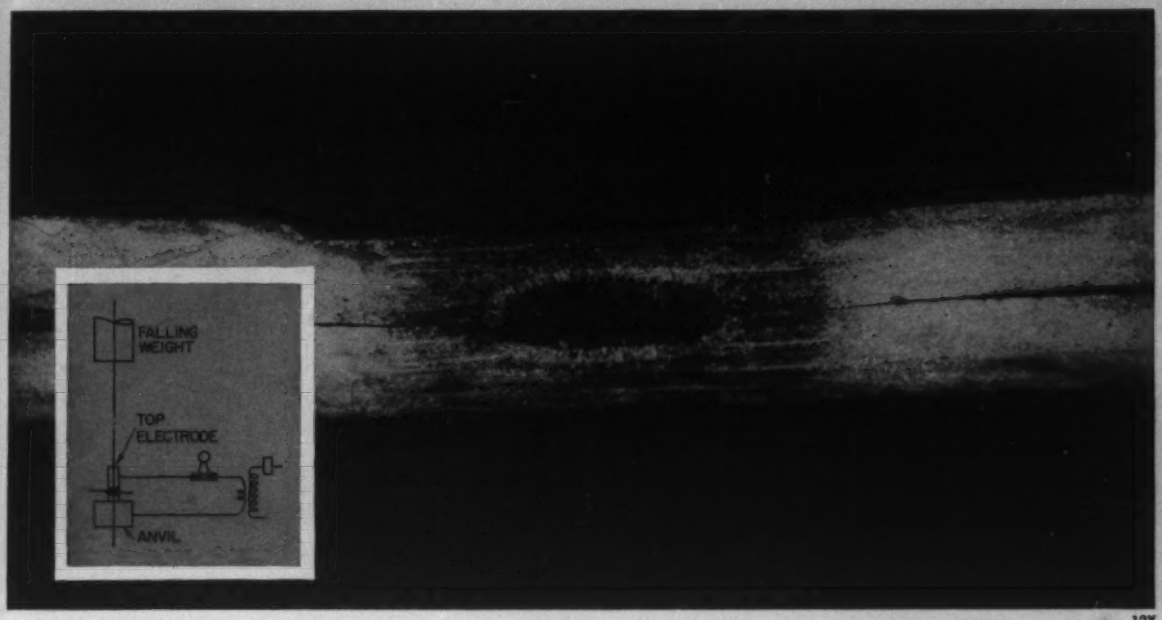
Nearly 412,000 lb of stainless were tailormade and rolled into plates up to 7 in. thick. Before welding, the plates were fully annealed, then placed in heavy jigs to minimize distortion during fabrication. Welds were designed to hold down magnetic permeability, but provide maximum strength.

Coil cases were made of stainless steel forgings or plates. Each coil was magnetically aligned with its case. A granite table reference plane, flat within 0.0004 in., was used to insure accurate alignment. The coils are permanently positioned by epoxy resin poured in the void between coils and cases.

• The unit will further studies of thermonuclear reactions and their possible use as power sources.

The Stellarator will enable physicists to study plasmas (gases ionized at extremely high temperatures) and interaction between plasmas and radiation.

The unit will confine the gas under study in a stainless steel vacuum vessel, and heat it to temperatures of several million degrees. Magnetic fields exerting forces up to 3 million lb will constrict the plasma to a cylinder smaller in diameter than the vacuum vessel. Use of nonmagnetic material in the unit is said to be helpful in the critical positioning of magnetic lines of force.



12X

Falling weight instead of squeeze makes high quality spotwelds

Impact Method Promises Light, Cheap Spotwelders

• RESISTANCE welding machines could be a lot lighter and cheaper, believes John F. Rudy, supervisor of welding research, Armour Research Foundation, Illinois Institute of Technology, Chicago.

Here's how: Remove most of the loading or "press" requirements of the welding machine and substitute a moving weight to deliver a blow to the electrodes. "You can drive a nail more easily with a light hammer than with a static press," he reasons.

Results: A typical mild steel weld (strips are 0.045 in. thick) develops a 1200 lb resistance in tension-shear, exceeding the minimum strength requirements of the Resistance Welding Manufacturers Association.

• Experiments already completed demonstrate that such an approach is feasible. Advantages are most evident where welds must be made near the center of large sheets.

To make "long distance" welds, resistance welder arms must withstand a great deal of leverage. Also, they must not interfere with part configuration. Sometimes that means special arms and you can't justify the expense unless it's a high volume operation. The falling weight approach would eliminate most of that problem.

To test his ideas, Mr. Rudy employed a relatively simple setup—an anvil (current carrying electrode), a top electrode, and a falling weight. The known weight falling from a measured height conveniently showed energy. A standard resistance welder provided the power.

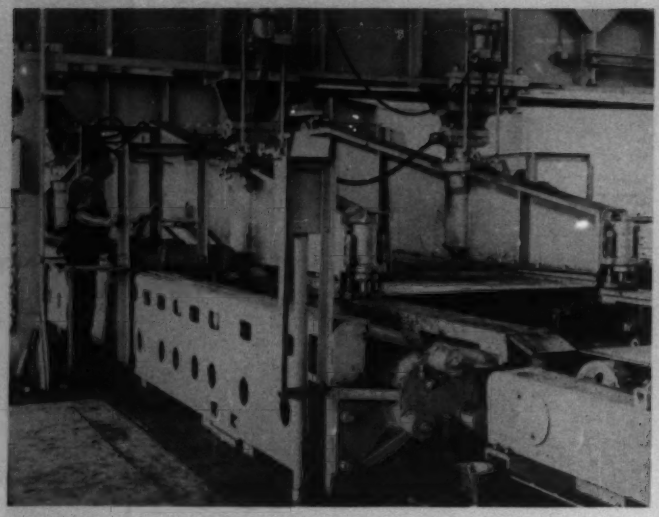
Welds were made by turning on power before impact, striking, and then allowing current to continue for a short time. Important factors: Drop height and weight; current, timing. (Armour employs 30-60 cycle current at 2000 to 10,000 amperes.)

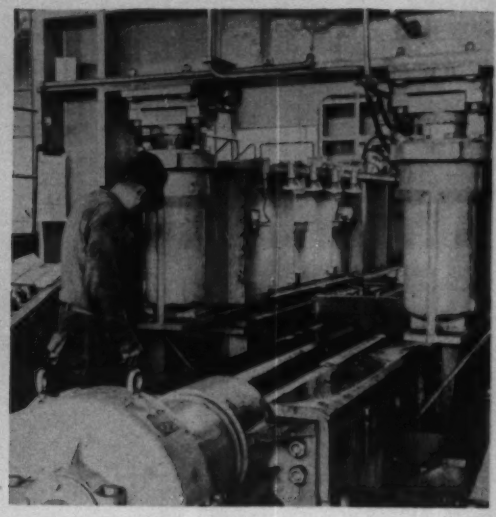
The preimpulse current establishes the temperature of parts at the beginning of the drop impulse and regulates the plastic behavior. So far, results have shown that a few cycles of current are adequate. The duration of force on the spot hasn't yet been determined, but, says Mr. Rudy, it probably isn't more than a few cycles. That can be varied by employing an air cushion or a spring between impacts with an air hammer.

Postimpulse current probably isn't as important as the first two factors, figures Mr. Rudy. A possible benefit is a reduced cooling rate regarded as significant.

• More work is needed to adapt the method to other materials, to develop schedules and check reproducibility data.

Before optimum schedules can be developed, more time is required to study fundamentals. The process is enough like conventional spotwelding to extrapolate heat, pressure, and time, but the main difference—application of load—introduces many factors yet to be determined.





Sides are squared simultaneously, ends are trimmed in sequence . . .

Plate Edge Planer Speeds Production of Line Pipe

• HIGH STRENGTH steel plates for large diameter, line pipe are planed accurately and rapidly in the Steelton (Pa.) plant of Bethlehem Steel Co.

The equipment, built by Birdsboro Corp., Birdsboro, Pa., provides the square cuts required to make high quality, welded joints. At peak production, both sides and both ends of a plate are planed every 2 to 3 minutes.

The heavy duty unit can handle up to 25,000 tons per month—enough steel to make about 3 miles of 18 to 42 in. OD pipe a day. The plates, up to ¾ in. thick, weigh 1 to 7½ tons each. They are 40 ft 6 in. long prior to planing and 52 to 130 in. wide.

• Both sides of plates are planed at the same time, in about 2 minutes.

Chain driven rollers carry plates through a slit in the side of the building and to the side planer. Before the plate enters the planer, it is positioned by two hydraulic jacks against the stationary side, to insure a square cut.

Two cutting carriages, one on each side of the planer, remove up to ½ in. of stock from each edge of the plate. Operators in the two carriages use grippers to pull plates into the machine on rolls. Then the plates are released for cutting.

Each plate is positioned on two clamping supports and centered for the cutting pass. A 41 ft, hydraulically operated beam clamp descends to hold the plate down along its entire length.

The machine planes in only one direction, making a single cut. It positions a new plate while automatically ejecting the finished one. It cuts on the backstroke and is ready to repeat the cycle immediately.

Each traveling carriage has 12 cutting tools designed and mounted to make a progressive cut. The planer (driven by a 300 hp, variable voltage, dc motor) cuts at an average speed of 60 ft a minute.

The whole planer moves laterally for width adjustment. One side is stationary for lining up the plate, while the beam clamp and carriage on the opposite side move with the worktable to accommodate different plate widths.

• A combination unit planes leading edges of plates with one set of tools, trailing edges with another.

After the sides are planed, the plate is ejected and rolled onto the end planer approach table. As the plate enters the end planer, it is squared against the stationary edge by hydraulic jacks. Four photoelectric cells automatically stop the plate in the right position for cutting.

Initially, the plate is clamped and cut on the leading end; then it is moved, stopped again by an electric eye, clamped, and cut on the trailing end.

A combination carriage, with eight tools on each cutting face, removes up to 5/16 in. of stock from each end of the plate. Powered by a 75 hp, variable voltage, dc motor, the planer carriage moves laterally at 46 to 107 ft a minute.

Unlike a shear, the planer can put a bevel (or any desired shape) on the ends of the plates. Hydraulic squaring devices, used in planing the leading and trailing edges, help insure a truly rectangular shape.

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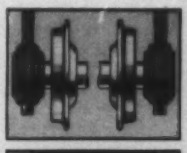
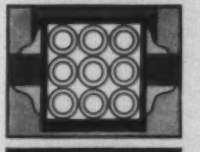
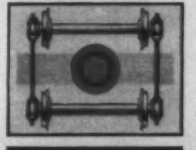


Anti-friction outboard bearings: High-capacity anti-friction bearings are located *outside* each of the car's eight wheels to minimize sideway and to provide long, smooth-running performance.



Seventy-two coil springs: Nine coil springs between each two wheels on both sides of the car—plus nine overload coils *inside* these—provide a total of 72 separate springs for a shock-absorbed *level* ride, so important in hauling molten metal.

High engineering safety factor: Designed for a 200-ton normal capacity load—including ingots, molds and stools—each car has a substantial built-in safety factor to withstand maximum ingot-stripping thrusts.



Oversize center plates: "Beefed-up" center plates between the trucks and car body are 18 inches in diameter—compared with the conventional 12 inches—to reduce the load per square inch on their surfaces.

Hot-metal shields: Curved end plates, long side skirts, and special drip shields protect the couplers, bearings and springs from runover molten metal and troublesome solidified drippings.

Slabs from a new bloomer will be cropped for rolling on the plate mill by a 1200 ton shear (foreground). Mill plan includes one reheat furnace and room for two more

New Plate Mill Is Built To Broaden Product Line

• LARGER PLATES will be available from Alan Wood Steel Co., Conshohocken, Pa., when a new mill goes into operation later this year. The mill and auxiliary equipment, which have been installed in the last two years, represent a $36 million capital investment.

Plans include use of the mill as a roughing system for a continuous, hot strip mill, which would provide wider coils than those the company is producing.

• Studies by the company's marketing division indicated the need for larger size plates and coils to compete with other suppliers of flat rolled steel products.

Those studies showed that the company should roll ingots up to 38,000 lb and produce coils weighing 500 to 600 lb per inch of width. The company will pour and process ingots weighing up to 21,000 lb in the immediate future.

A 40 by 96 in., high lift blooming mill was obtained from Birdsboro Corp., Birdsboro, Pa. to handle the large ingots. Conduits have been installed for quick changeover to card programed operation, but the bloomer will be operated initially under manual control.

The market survey indicated that Alan Wood Steel's optimum plate size would be 3/16 to 4 in. thick and up to 96 in. wide. (The company's older mill was capable of producing plates up to 72 in. wide, 3/16 to 1 in. thick.)

• Expansion plans allow for additional soaking pit capacity and increased slab heating facilities.

Relocation of the blooming mill makes space available for two new soaking pits, each of which would hold a heat of steel.

A three zone, pusher type, slab heating furnace, rated at 140 tons per hour, prepares slabs from the blooming mill for rolling in the plate mill stands. The furnace, which was obtained from Rust Furnace Co., Pittsburgh, is fired with oil or gas and equipped with "thermal" metallic recuperators. Later expansion will provide two more furnaces of the same type, to heat slabs for production of hot strip. Space has been left open for

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installation of the two additional units.

• Slabs will be rolled to plate thickness on a four high, reversing mill.

The scale breaker stand, which cleans scale from the heated slab with a light pass and with high pressure water sprays, was supplied by Mesta Machine Co., Pittsburgh. Also supplied by Mesta: A four high, reversing, roughing mill, which will do most of the rolling to bring slabs to plate thickness. It will turn out plates within 20 per cent of finished gage. The rougher will handle slabs 36 to 96 in. long for crossrolling; in straightaway processing, it will roll from slabs up to 190 in long.

The roughing stand will be equipped with x-ray thickness gages and pyrometers. It will be operated manually for the time being but can be adapted quickly to card programing.

• A planishing pass or patterned surface will be provided by a four high, nonreversing mill.

The straightaway, four high mill, which was supplied by Mesta Machine, will use the same size rolls as the reversing rougher; its design is much the same.

Main purpose of the nonreversing mill: To provide a planishing pass for flat surface plates, or to roll the company's proprietary, diamond pattern into floor plates, in gages up to 2 in.

• Close control of plate dimensions is insured by a versatile system of shear equipment.

A Birdsboro parting shear (1½ by 100 in. capacity) will cut plates, as-rolled, into sizes that can be transferred readily to the plate finishing line. A Birdsboro hot leveler will flatten plates 3/16 to 1½ in. thick.

The plate finishing shear line will include a Birdsboro 1½ by 100 in. crop shear; a United Engineering & Foundry rotary side shear with a capacity of ¾ by 100 in.; and a Birdsboro 1½ by 100 in., cut to length shear. The shear line is capable of cutting plates to length in thicknesses up to 1½ in. Plates up to ¾ in. thick can be cut to specified length and width. Heavier plates are cut to size with a resquare shear or flame cutters.

Ultrasonic Line Cleans Metal Parts Automatically

• A SERIES of ultrasonic cleaning machines designed by Autosonics Inc. (Philadelphia) automatically processes metal parts and electronic components on a continuous, self-contained flow basis. The manufacturer says cleaning is 30 per cent more efficient than with conventional techniques.

Designs include portable units with no piping or ventilation problems. The units can clean stampings, fragile machine parts, ball bearings, and screw machine parts. No problem is encountered with intricate configurations.

One of the machines, the Multi-wheel Model 30-6, moves parts through a series of rotating wheels that provide a detergent wash, ultrasonic scrubbing, rinsing, and drying before being discharged at room temperatures.

• The manufacturer says the operation, which can process as many as 18,000 parts an hour, can be integrated into any normal production line.

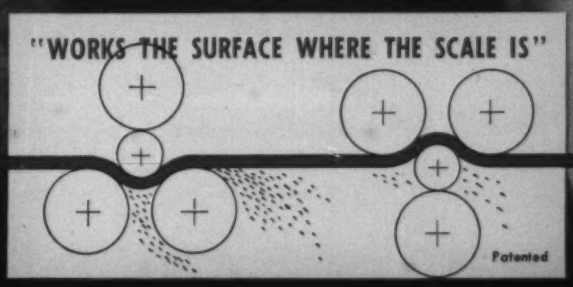
On the Model V-72, cleaning is done in a 270 gallon steel tank powered by a Westinghouse Magnapak, a spaced laminate transducer. A Westinghouse, solid state, Trinistor generator drives the transducer.

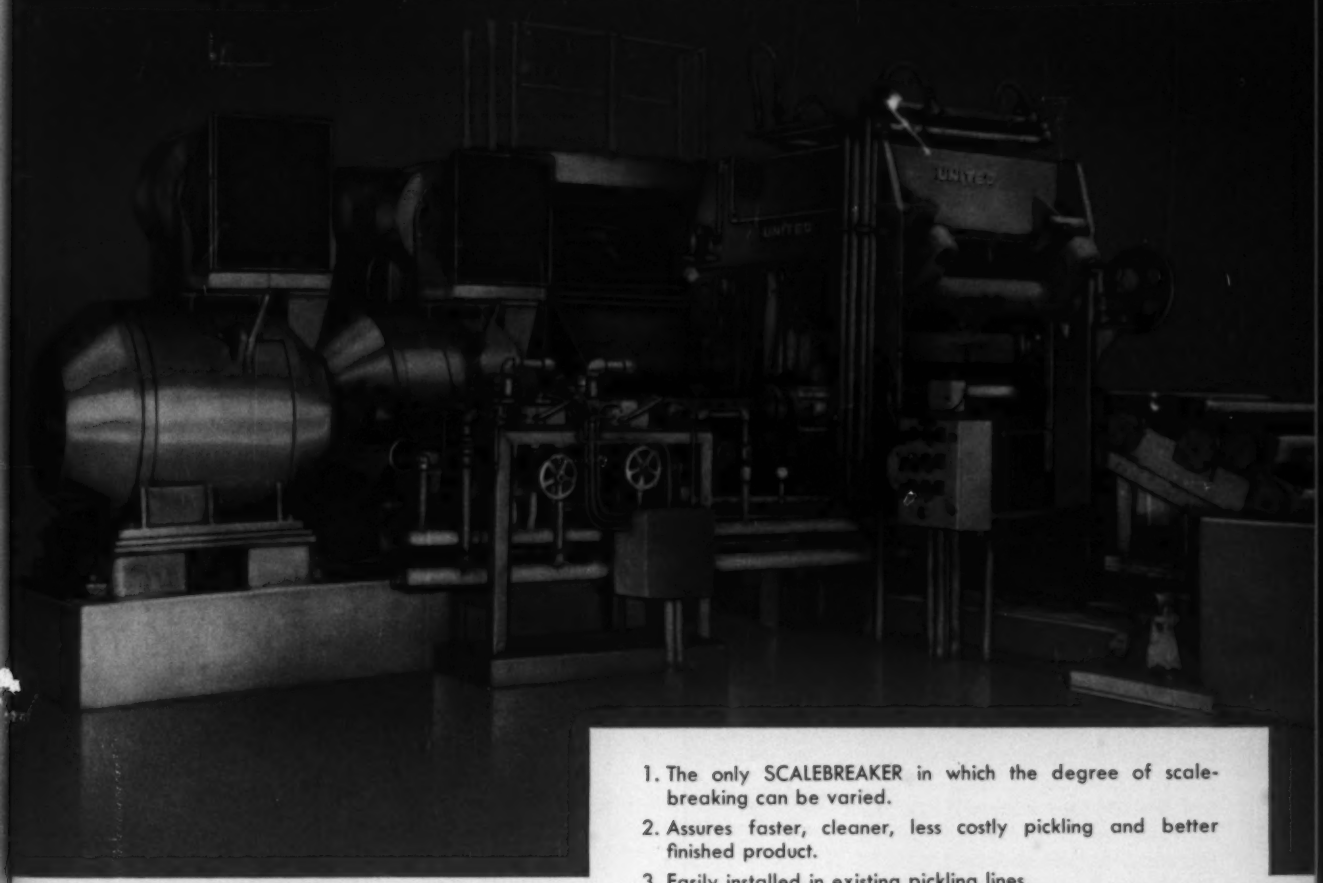
Truck Carries Slag to Pits

HERE is a slag carrier idea that features low initial investment, low operating cost, and freedom of movement. In use at many German blast furnaces and steel mills, the truck carrier can travel up to 20 mph with 77,000 lb loads. After the slag ladle is filled, the carrier picks it up with two hydraulically operated arms and carries it piggyback style to the pit for dumping. Heat barriers protect the cab from ladle heat (sometimes as high as 2800° F).

UNITED

Strip Processing SCALEBREAKER





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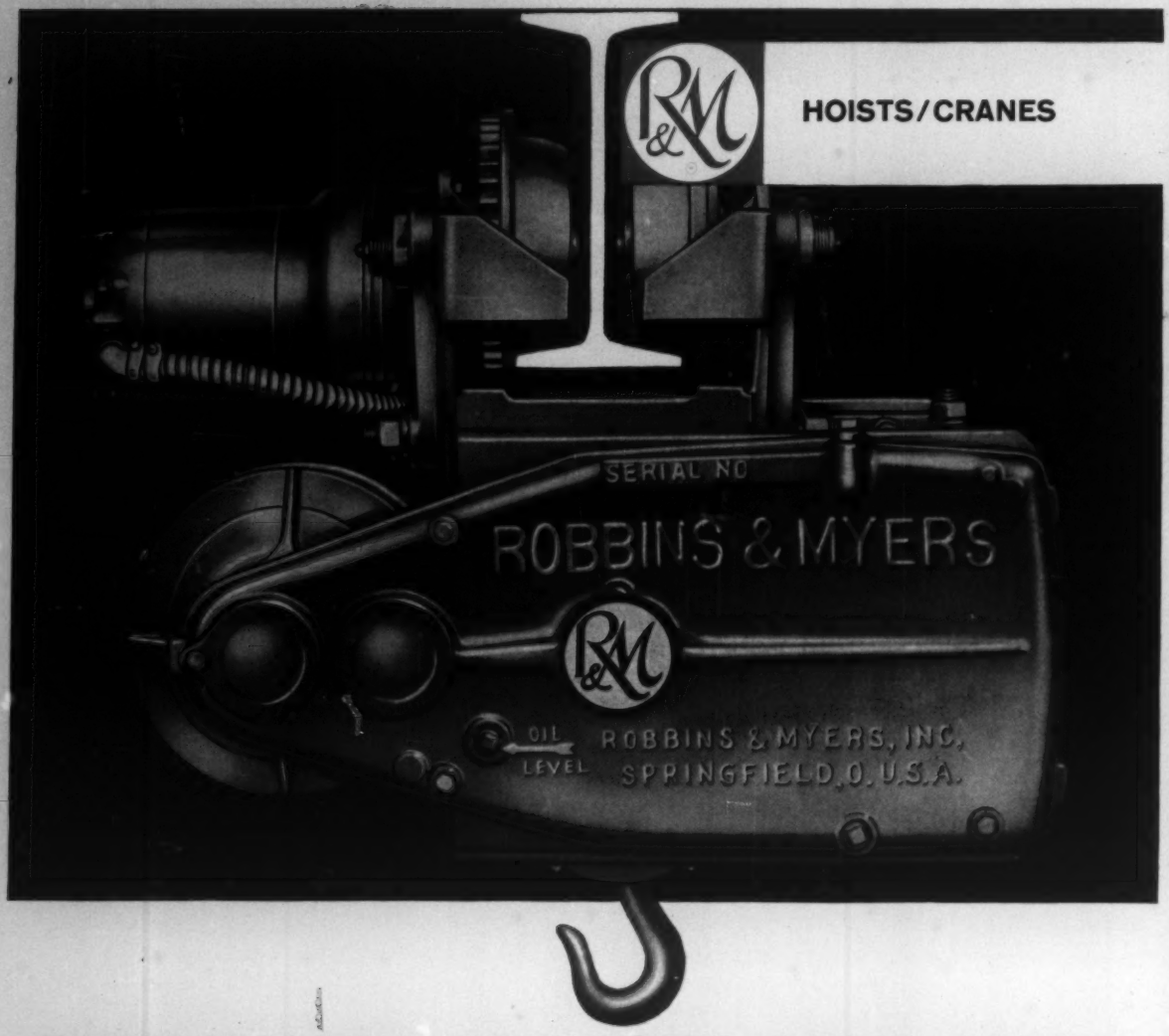

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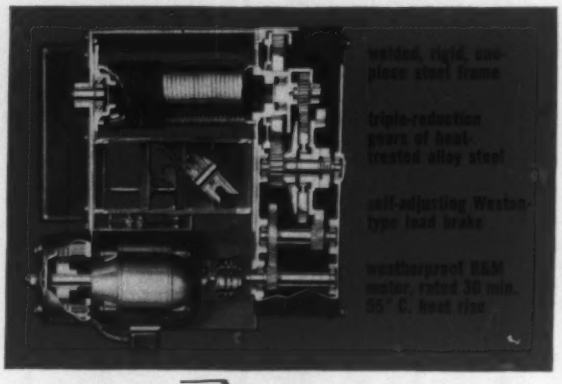
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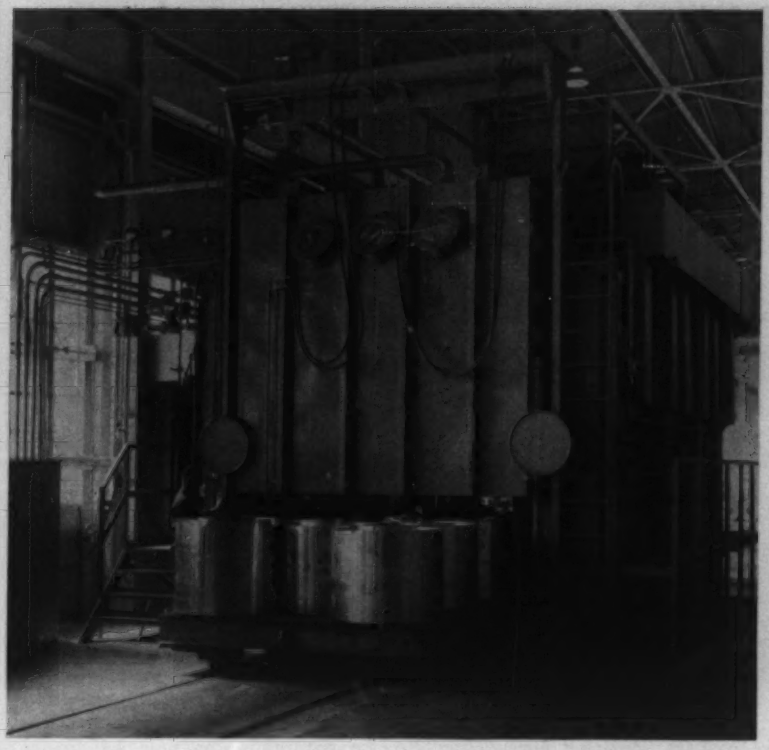
Subsidiary companies at: Memphis, Tenn., Pico Rivera, Calif., Brantford, Ontario.



Support grid under aluminum coils distributes circulating atmosphere for uniform heating

Atmosphere Annealing Cuts Aluminum Coil Rejects

• REJECTS DUE to oil staining have been eliminated and closer control of metallurgical results has been obtained by the use of controlled atmosphere, high recirculation rate, and automated temperature cycling in a furnace for annealing aluminum.

Consolidated Aluminum Corp., Jackson, Tenn., maker of superpurity aluminum for metal refining, chemical processing, and consumer products procured the furnace from Sunbeam Equipment Corp., Meadville, Pa.

• The furnace's high recirculation rate is an aid in bringing large loads to temperature rapidly and uniformly.

Rated capacity is 60,000 lb at a maximum temperature of 1200° F with a heat input of 7,500,000 Btu per hour. The car bottom unit has a work space 8 ft wide, 20½ ft long, and 5½ ft high. Three large (100 hp) centrifugal fans move the atmosphere over the load. An air distribution baffle system in each of the two cars helps maintain the proper circulation pattern for uniform heating. The furnace inner liner is stainless steel, protecting the insulation from the effects of the high velocity atmosphere.

Since the work is handled in coils, the high circulation rate helps control the grain size of the metal by making the heating more nearly uniform. And the more rapid heating means more production from a given furnace size.

Use of two cars for the car bottom furnace permits loading or unloading one car while the other is being heated. Doors at each end of the furnace simplify the trackage arrangement.

• The gas fired furnace has provisions for both heating and cooling under the protective atmosphere. This atmosphere avoids oil staining.

To prevent mixing the products of combustion with the furnace atmosphere, the combustion gas is burned in radiant tubes. Corrugated stainless steel baffles, which separate the tubes from the work area, prevent direct radiation from the tubes to the work; that eliminates the possibility of local overheating.

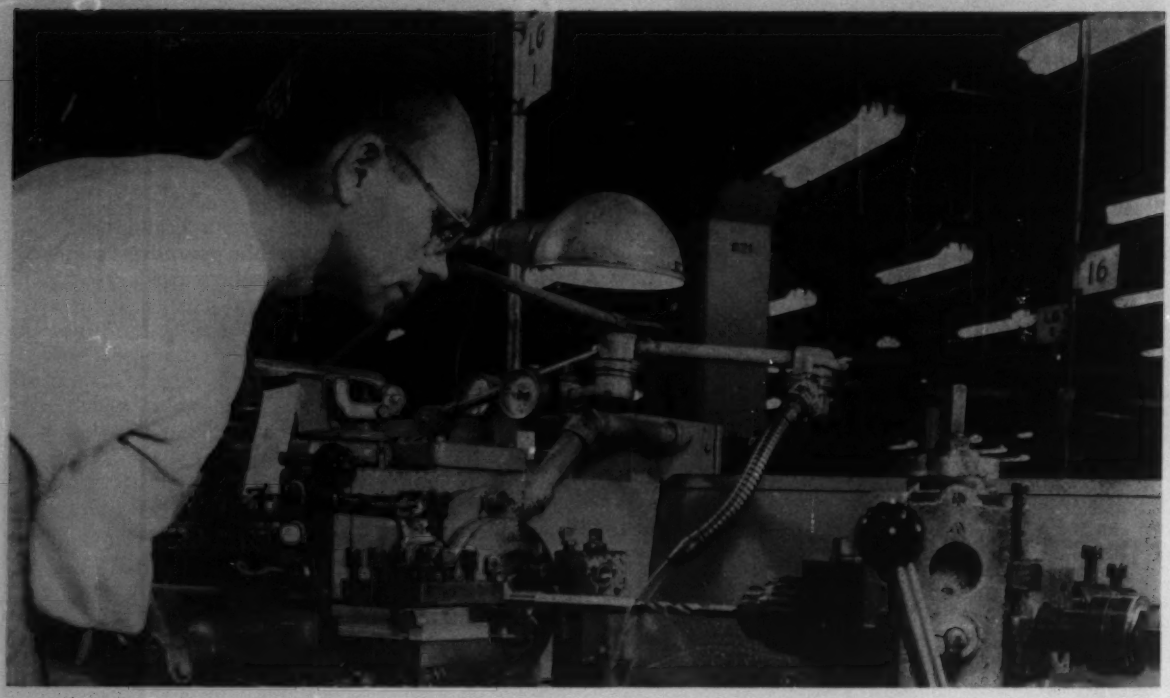
Cooling, still under the controlled atmosphere, is provided by a finned type heat exchanger. A separate fan circulates the atmosphere between the furnace chamber and the heat exchanger when the load is to be cooled; an automatic bypass damper separates the cooler from the furnace while the charge is being heated.

Radiant tubes and fan assemblies can be removed for maintenance, and burner adjustments are made from accessible points.

Atmosphere is provided by a generator rated at 8000 cu ft per hour. Exogas (an atmosphere consisting of nitrogen, hydrogen, and carbon monoxide, produced by controlled combustion) permits annealing without oil staining.

• After the purge cycle, operation is automatic.

After the load is charged, the operator sets the control for the purge temperature. Atmosphere is introduced into the furnace until an oxygen analyzer shows only a trace of free oxygen. At that point, a bell rings and the operator sets the heating zone instruments for the desired annealing temperature. When the hottest thermocouple in the load reaches the desired annealing temperature, the instruments are automatically reset to the soak temperature and a light signals the operator. When the coldest thermocouple reaches the soak temperature, a timer is started; it times out at the end of the soak period and initiates cooling. A light and bell signal the operator that the cooling has started.



Company reports better machining, lower handling costs as . . .

Checking for Duplications Reduces Cutting Oil Costs

• LARGE COST reductions and improvements in efficiency were the prime benefits Chance Vought Corp. realized by eliminating dozens of cutting oils that weren't required in machining operations at its Dallas plant.

With four oils that match requirements, the company was able to make significant purchasing economies, release valuable oil storage space, and lower over-all maintenance and production costs by lessening the risk of cutting oil misuse.

• The company's oil supplier (Gulf Oil Corp.) provided data for the simplification program.

For especially difficult machining jobs (involving tough cutting and draggy ferrous metals), Chance Vought picked a cutting oil containing extra heavy concentrations of sulfur, chlorine, and fatty oils for good load carrying and antiweld features (the chlorine takes effect at a lower temperature than sulfur and is advantageous where antiweld and pressure resisting properties must cover a wide temperature range). Addition of fatty oils combines the commonly used additives into one cutting fluid that is effective for a wide range of machining operations, particularly heavy duty machining, says Gulf.

The second major cutting oil selected: A versatile, mineral-lard oil. It handles the machining of magnesium, aluminum, and other nonferrous metals where staining from sulfurized oils is objectionable. The oil's light viscosity makes it suitable for blending with other cutting oils to fit special job requirements.

The third cutting oil Chance Vought chose is compounded for thread grinding operations. It contains an antifoam agent and corrosion inhibitor—both important in circulating systems of thread grinding machines. Chance Vought says the oil helps provide good finish, accurate tolerances, long wheel life, and minimum root breakdown and burning.

The fourth fluid is a general purpose soluble oil. Because of effective cooling-lubricating properties, the emulsifying oil is used in operations having high cutting speeds and low cutting pressures, accompanied by considerable heat generation.

• Case histories show such benefits as faster feeds and speeds, longer tool life, and good cooling.

On a Brown & Sharpe automatic, producing a Type 321 stainless bolt, the sulfo-chlorinated-lard oil (Gulfcut 45B) helps the operator maintain +0.000 in., −0.0002 in. on the bolt's 0.3120 in. diameter, and

±0.005 in. on its ½ in. length. The operator reports higher feeds and speeds, longer tool life, and a consistent 125 microinch finish.

On a DeVlieg Spiramatic Jigmil, a light viscosity mineral-lard oil (Gulfcut 11D) contributes to tool life in the machining of AISI 4340 steel. The piece is a shank assembly arresting gear for jet fighter planes. Turning the boss to 1.902 in. (+0.000 in., −0.002 in.) the operator uses a speed of 78 rpm and a feed of 0.0045 ipr. The company says tools can take 130 parts between grindings.

In a profiling operation on the same part (reformed on a three spindle Cincinnati Hydro-Tel), the sulfo-chlorinated-lard oil is cut back 50 per cent with the light viscosity, mineral-lard oil. The oils prevent metal to metal contact and welding of chips to the tool. Heat is quickly removed from the point of contact.

The operator on the Hydro-Tel reports that occasional sluggishness (caused by fine chips infiltrating the gearbox) is rectified by flushing with the light viscosity, mineral-lard oil. Although not a flush oil or hydraulic oil, the light viscosity does the trick.

With a special thread grinding oil (Gulfcut 41TG), excellent wheel life is reported on an Ex-Cell-O thread grinder. The workpiece is a special bolt trunnion attachment (AISI 4130, 1½ in. long, ¾ in. in diameter, 16 pitch). Wheel breakdown and loading are eliminated, say the operators. Wheel life was termed excellent. No rancidity was reported.

Strain Gages Applied by Flame Spraying Process

HIGH temperature strain gages are being flame sprayed on surfaces at Boeing Co.'s Aero-Space Div., Seattle. Besides aircraft and spacecraft use, researchers speculate that the flame sprayed versions may replace conventional types for high temperature use due to slower deterioration. Limits are now 1200° F, but are expected to be pushed past 2000° F. Other applications: Heat sensors and erosion and ablative gages. Accuracy is no problem.

Generating as much as 50,000 psi . . .

Hydrostatic Press Forms 1 x 5 ft Refractory Parts

• A BIG hydrostatic press is shaping powdered metals into forms up to 5 ft long and 12 in. in diameter at the Carmet Div. plant (Ferndale, Mich.) of Allegheny Ludlum Steel Corp.

The vertical press is rated at 50,000 psi. The interior of the chamber is 6 ft long and 16 in. in diameter. It holds 60 gallons of chemically treated water.

• The press opens up new market areas for the company.

Production possibilities include the processing of hard refractory metals used in missile nose cones and the production of long boring bars, steel mill rolls, and nuclear fuel elements.

Mass production of smaller shapes usually formed in hydraulic and pill presses is also possible, says Allegheny Ludlum.

The powdered metal is tightly packed into rubber molds, then cased in perforated steel tubes which are lowered into the press chamber.

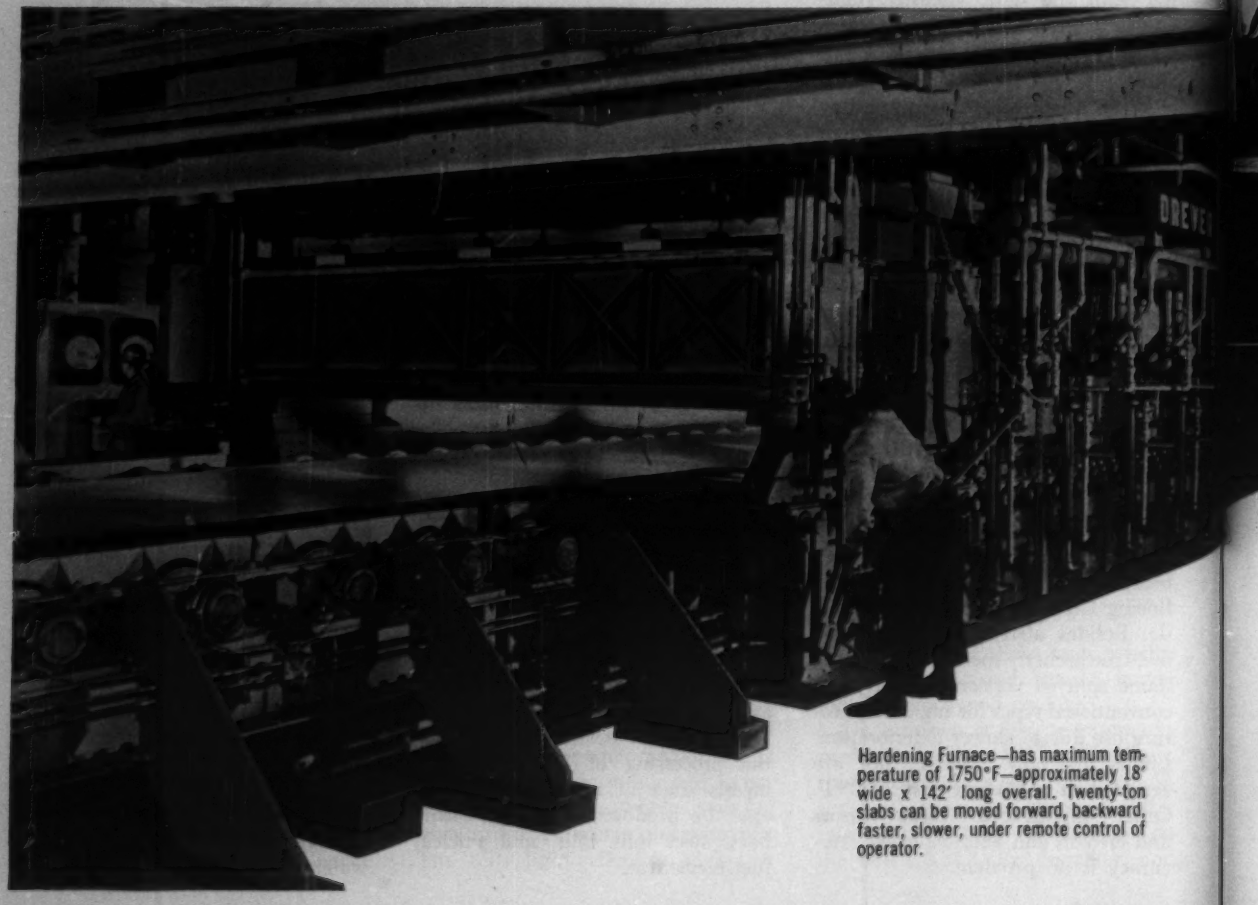
After the molds are lowered, the chamber is sealed with a large plug that is moved into place by hoist, then screwed down. Pressure is generated in the cylindrical chamber by forcing additional water into the chamber. Air is excluded.

Advantages of the vertical design include easy loading and unloading by crane, and the chemically treated water is re-used.

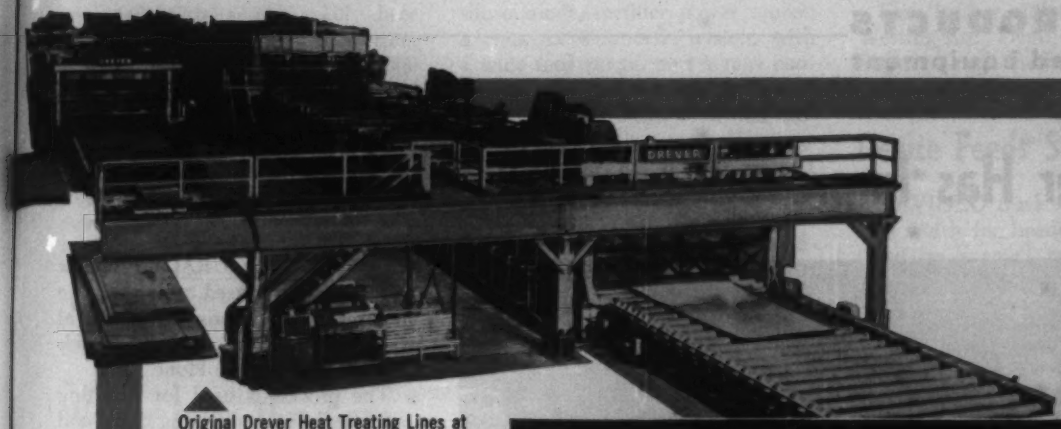
NOW 4 DREVER CONTINUOUS WIDE PLATE HEAT TREATING LINES OPERATING AT U.S. STEEL'S HOMESTEAD WORKS

WITH FOUR Drever Continuous Heat Treating Lines in operation, the Homestead District Works of United States Steel Corporation has the most complete and flexible continuous heat treating plant for plate in the steel industry. The Drever Lines serve their 160″ and 100″ plate mills. Carbon, alloy and stainless plates ranging from 1/10 inch to 2 inches thick over the full hearth width, and up to 45′ long are handled in automated, prescribed operations that assure accurate, uniform treatment. Each line is operated by a single man through closed circuit television monitoring and under "pushbutton" control. The only handling required is at the charge and discharge points.

The versatility of the Drever equipment in processing wide plate for normalizing, for hardening and tempering, for annealing provides the Homestead Works with facilities for high, economical production to meet the ever growing demand for heat treated steel plate.

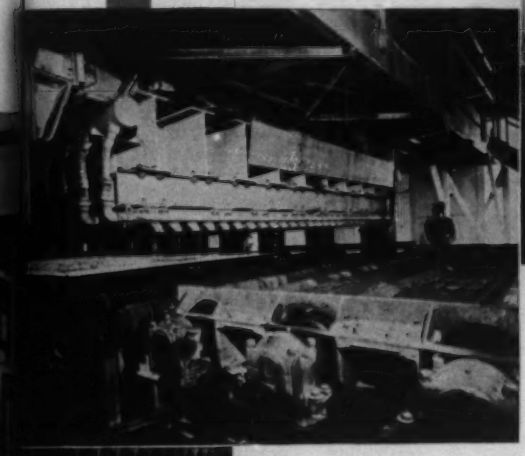


Hardening Furnace—has maximum temperature of 1750°F—approximately 18′ wide x 142′ long overall. Twenty-ton slabs can be moved forward, backward, faster, slower, under remote control of operator.



Original Drever Heat Treating Lines at Homestead consist of charge table, hardening furnace with pressure quench and, on left, charge table and oscillating furnace for annealing stainless steel.

Heated plate on transfer table leaving tempering furnace on right to enter pressure quench on left. One man (arrow) in control booth handles entire processing by means of "pushbutton" control.



2,500-ton pressure quench which holds plate while being flooded with 21,000 GPM of water. Except for very light gauges, plate so quenched will not require leveling.

DREVER ENGINEERING FOR YOU

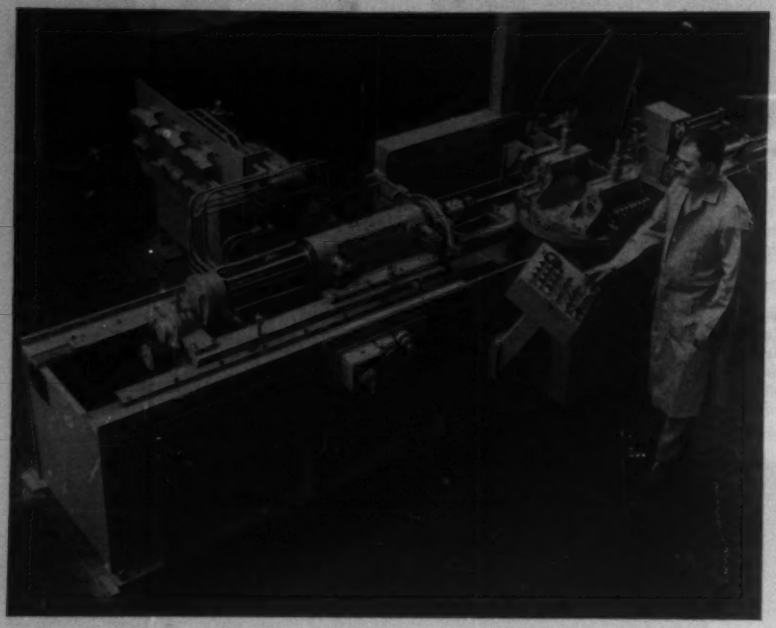
Drever Company has built and is engineering wide plate heat treating and strip annealing lines for steel mills across the United States and around the world. At the same time, they are producing less massive equipment for sintering, annealing, vacuum heat treating, descaling and many other metal heat treating processes. Heat Treating Specialists since 1939, they have extensive experience in all phases of metal improvement through the use of heat and atmospheres. Consult with Drever Engineers about your own process requirements. Write or phone. Drever Company, Bethayres, Pa. Wilson 7-3400.

DREVER INDUSTRIAL FURNACES

ENGINEERED TO YOUR PARTICULAR REQUIREMENTS

ENGINEERING AND MANUFACTURING FACILITIES AROUND THE WORLD THROUGH ASSOCIATES IN FRANCE, GREAT BRITAIN, GERMANY, ITALY, JAPAN AND INDIA

Finisher Has Improved Accuracy, Shorter Cycle



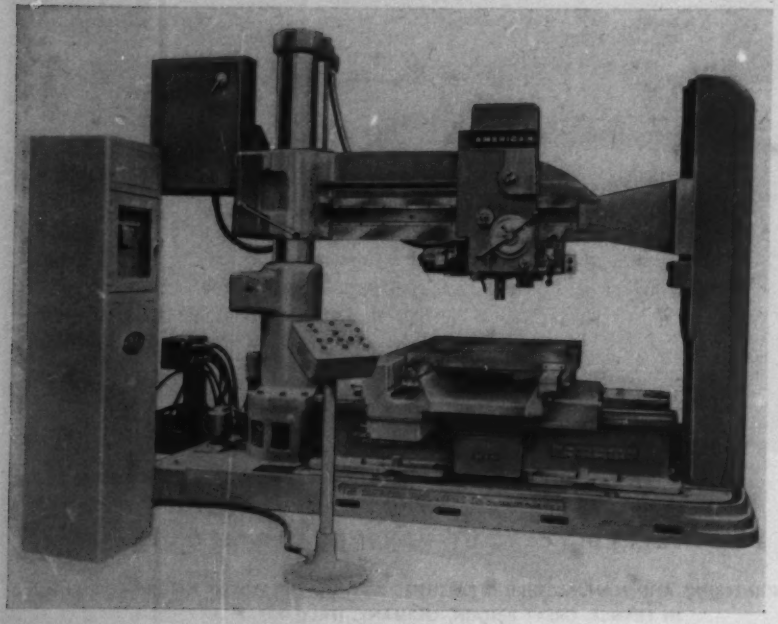
GREATER ACCURACY, longer tool life, and reduced cycle time are features of an improved horizontal stack-Microhoning machine developed by Micromatic Hone Corp.

The process is used for finishing parts such as connecting rods and gears where the bore length is comparatively short with respect to bore diameter. The parts are stacked and Microhoned as one long part.

Advantages: High production rates, machine simplicity, and reliability. Only one spindle is used. Abrasive economy is improved by long stones, says the manufacturer. The short, rigid base and a short tool helps improve accuracy by making the tool more rigid. Accuracy is also improved by a tool adapter that minimizes tool runout.

For further information, *write* Micromatic Hone Corp., 8100 Schoolcraft Ave., Detroit 38, Mich.

Machine Combination Features High Accuracy



THIS PACKAGE includes an 11 in. column boring and drilling machine combined with a numerically controlled, precision positioning table. It's called the 511-12 semi-automatic precision boring, drilling, reaming, and tapping machine.

After dials are manually set, controls on the unit automatically traverse the spindle to the workpiece, feed it to a preselected depth, then traverse it back to the starting point. The cycle continues automatically until a tool change becomes necessary.

The spindle and sleeve are precision boring mill types made of nitrided Nitralloy steel and honed to 0.0002 in. sliding fit. Spindle travel is 12 in. Maximum distance from the spindle to the table top is 37¾ in. Power feeds (12) give from 0.001 to 0.025 in. per revolution. Twelve spindle speeds are

provided with a choice of three ranges including 30 to 1500 rpm, 45 to 2250 rpm, and 60 to 3000 rpm. The main drive motor is rated at 7½ hp.

The positioning table travels 30 in. on each axis, and has a positioning accuracy of ±0.00025 in. with repeatability of ±0.000050 in. The table is positioned hydraulically.

For further information, *write* American Tool Works Co., Pearl at Eggleston Avenue, Cincinnati 2, Ohio.

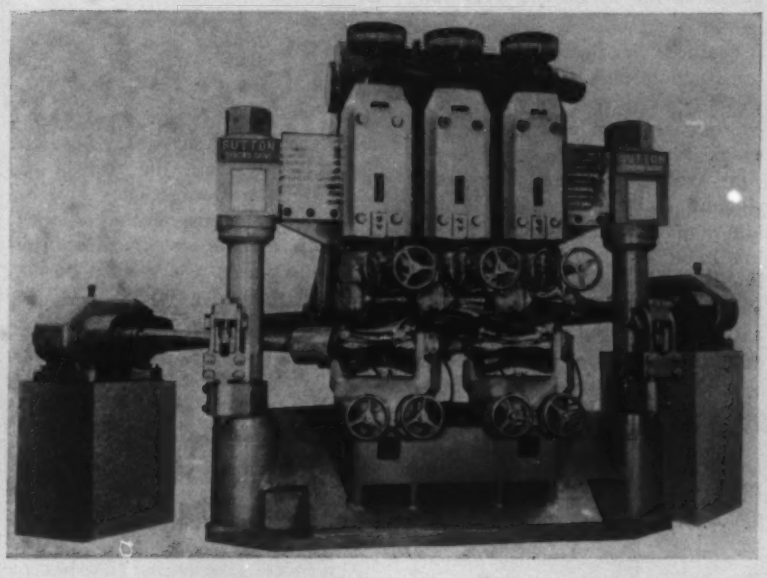
Welder Joins Thin Gage Stainless and Mild Steel

FAST, VERSATILE welding of thin gage steel, mild or stainless, at low cost is the claim for a welding package called the Westing-Arc SA-200 system. It includes a 200 ampere, silcon diode, rectifier power source; a compact wire drive system with a wide feed range, and a new concept in straight through torches.

The torch is light, cool, and easily maneuverable, says Westinghouse. It weighs 22 ounces and will accommodate wire sizes in mild steel or stainless from 0.025 to 0.047 in. The development speeds welding in awkward positions by keeping the handle and mounted switch in the most comfortable position. The torch is rated 100 per cent duty cycle at 200 amperes. A 15 ft welding cable, gas hose, and electric control cable come with the torch.

The wire drive system has a range of 90 to 424 ipm with standard gearing and can be modified to provide speeds up to 1170 ipm. Both drive rolls operate to provide more positive drive feed. A micrometer provides wire feed control adjustments.

For further information, *write* Westing-Arc Dept., Westinghouse Electric Corp., Buffalo 5, N. Y.



Unit Straightens Tubes at High Speeds

YOU CAN straighten steel tubes with precision at high speeds with the Sutton five roll machine. Known as the 18SD, the rotary straightener is designed for ½ to 4 in. standard, line, and extra strong steel pipe. In addition, the equipment can handle thin walled tubes and bars of stainless, brass, zirconium, titanium, and other metals.

With a 75 to 100 hp motor (adjustable speed) running from 400 to 1600 rpm, throughput speeds are 175 to 700 ft per minute. Two designs are available for straightening ½ to 4 in. pipe at throughput speeds of 250 to 1000 ft per minute.

For further information, *write* Sutton Engineering Co., First National Bank Bldg., Pittsburgh 22, Pa.

Device Feeds Small Parts

A DIVIDED track with an adjustable width for headed parts is featured on a small parts feeder. It is designed for operation with assembly and other types of equipment, including Dixon positioners and Auto-Torque drivers.

Two sizes are offered: Small (Model FE-101) and large (Model FE-104).

The use of horizontal axis drums minimizes width of bowl feeders enabling installation in close quarters and providing unusual bowl capacity. Straight tracks provide optimum control of parts to the point of escapement, and neoprene vanes on the inside of the drums provide gentle handling of parts. The feeders can be furnished fully tooled for the job or with a blank track ready for machining to suit the part. Air operated escapements or other types can be used. Model FE-101 can be motor driven or the drum can be actuated by the air operated escapement. Model FE-104 is motor driven.

For further information, *write* Dixon Automatic Tool Inc., 2300 23rd Ave., Rockford, Ill.

Simple Design Stressed in Line of Index Tables

DESIGN SIMPLICITY is stressed on a series of 10 and 18 in. index tables that provide slow starts and slow stops. The index time with slow start and slow stop can be as brief as 1/3 second or designed to meet any time factor required.

The company says the unit locks positively with no backlash. You can get up to 16 stations on the 10 in. tables and up to 36 on the 18 in. tables. The company says any number of 10 in. tables or any number of 18 in. units can be used in tandem for a production or conveyor line type of operation. Three working sides of each table can be used. Standard table rotation is clockwise. Power for the worm gear drive can be provided by fractional

For Quality and Economy Use

MALLEABLE

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CONNECTICUT
Connecticut Mall. Castings Co., New Haven 6
Alloy Foundries Division, The Eastern Co., Naugatuck

ILLINOIS
Central Fdry. Div., Gen. Motors, Danville
Chicago Malleable Castings Co., Chicago 43
Moline Iron Works, Moline
Moline Malleable Iron Co., St. Charles
National Castings Co., Cicero 50
Peoria Malleable Castings Co., Peoria 1
Wagner Castings Company, Decatur

INDIANA
Albion Malleable Iron Company, Muncie Division, Muncie
Link-Belt Company, Indianapolis 6
National Castings Co., Indianapolis 22

IOWA
Iowa Malleable Iron Co., Fairfield

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Belcher Malleable Iron Co., Easton

MICHIGAN
Albion Malleable Iron Co., Albion
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Northern Malleable Iron Co., St. Paul 6

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Laconia Malleable Iron Co., Laconia

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Frazer & Jones Company Division, The Eastern Co., Solvay
Oriskany Malleable Iron Co., Inc., Oriskany
Westmoreland Mall. Iron Co., Westmoreland

OHIO
American Malleable Castings Co., Marion
Central Fdry. Div., Gen. Motors, Defiance
Dayton Mall. Iron Co., Ironton Div., Ironton
Dayton Mall. Iron Co., Ohio Mall. Div., Columbus 16
National Castings Co., Cleveland 6

PENNSYLVANIA
Buck Iron Company, Inc., Philadelphia 22
Erie Malleable Iron Co., Erie
Lancaster Malleable Castings Co., Lancaster
Lehigh Foundries Company, Easton
Meadville Malleable Iron Co., Meadville
Pennsylvania Malleable Iron Corp., Lancaster

TEXAS
Texas Foundries, Inc., Lufkin

WEST VIRGINIA
West Virginia Mall. Iron Co., Point Pleasant

WISCONSIN
Belle City Malleable Iron Co., Racine
Chain Belt Company, Milwaukee 1
Federal Malleable Company, Inc., West Allis 14
Kirsh Foundry Inc., Beaver Dam
Lakeside Malleable Castings Co., Racine
Milwaukee Malleable & Grey Iron Works, Milwaukee 46

These companies are members of the Malleable Castings Council

NEW PRODUCTS and equipment

horsepower electric, rotary air, or hydraulic motors. The 10 in. diameter tables are adaptable to ¼ hp motors for handling loads up to 200 lb. The 18 in. tables are adaptable to ½ hp motors for loads up to 400 lb.

For further information, *write* Jackson Fluid Power Co., Detroit, Mich.

Fluid Motors Go Up to 2000 rpm, 2000 psi

VANE TYPE fluid motors designed by Denison Engineering are available in speeds to 2000 rpm and pressures to 2000 psi. Five models provide torques of 1249, 1719, 1897, 2160, and 2345 lb-in. at 2000 psi. The line (called MID) is similar in design to the company's TID vane pumps.

Featured is floating port plate construction with a built-in shuttle valve which keeps the plate under constant uniform pressure load regardless of flow through the motor. The port plate exerts necessary clamping force on the cartridge. At idle, a light spring provides clamping force. The company says the floating port plate minimizes wear and permits starting at any temperature. Centralized location of all ports in the end cap permits installation of the motors in a minimum of space.

For further information, *write* Denison Engineering Div., American Brake Shoe Co., 1160 Dublin Rd., Columbus 16, Ohio.

Grinding Mill Simplified For Easier Maintenance

A VIBRATING grinding mill made by Allis-Chalmers has been redesigned for easier maintenance. It's now available with 15, 36, and 42 in. chambers.

The vibrating mechanism has been relocated from the grinding chamber's interior to positions adjacent to the chamber (to eliminate bearings within the chamber).

Because the vibrating mechanism is completely enclosed, circulating lubrication is not required.

Other design modifications include a friction check (it replaces stabilizing cables and springs) which effectively dampens harmonic motion during mill startup and shutdown, a redesigned base that reduces headroom requirements from 6 ft 6 in. to 3 ft 8 in., and a steel plate grinding chamber head that permits use of one piece feed liners and discharge grates (both bolted to heads).

For further information, *write* Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.

Magnetic Support Aids Gaging on Squaring Shears

ACCURATE gaging of thin, wide, flexible sheets on Niagara power squaring shears can be done by a magnetic sheet support introduced by the company.

Designed for ferrous materials 16 gage and lighter, the support has several sets of magnetized rollers attached to the crosshead of the squaring shear. The rollers grip the material and hold it level as the sheet passes from the rear of the bed to the back gage. Holding power of the magnetized rollers is enough to support the sheet until it is cut. Then the severed portion falls free instantly.

For further information, *write* Niagara Machine & Tool Works, 683 Northland Ave., Buffalo 11, N. Y.

Strippable Plastic Coat Protects Aluminum Finishes

BUFFED or anodized finishes on aluminum extrusions can be protected by a process called cocooning. It involves automatic spray coating of a strippable plastic coat.

The baked on coating may be applied to the entire extrusion surface, including areas of complicated contour design. Abrasion tests indicate, says the company, that adequate surface protection continues under hot and cold temperatures as well as extreme humid conditions. The company adds that the coating is suitable for most forming operations—for example: A

Post-Forming: New Way to Bigger Savings with Malleable Castings

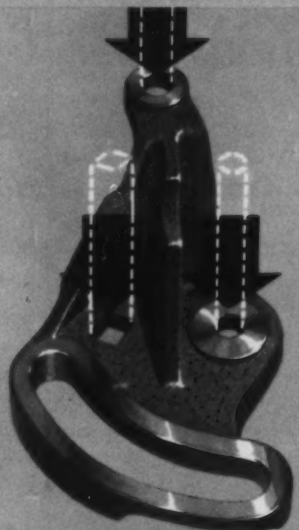
The ductility of Malleable iron castings permits use of high-speed forming techniques to finish Malleable parts at lower cost. Take advantage of the versatility you get only with ferritic and pearlitic Malleable castings. For a fuller understanding of how Malleable can help you, call any producer that displays this symbol —

Free Folder describing these techniques is available for your use. Just ask any member of the Malleable Castings Council for Data Unit No. 116, or write to Malleable Castings Council, Union Commerce Building, Cleveland 14, Ohio.

MEMBER
MALLEABLE
CASTINGS COUNCIL

Hot Form It — Hot coining this Malleable transmission part reduces finished cost . . . eliminates three cutting operations required by the previously used steel part.

Roll It — Oil grooves in lawnmower crankshafts and splines in compressor crankshafts are just two of many places where rolling proves more economical than machining.



Punch It — Holes with diameters greater than the thickness of the metal can be punched in Malleable. Two round holes and a square hole are punched simultaneously in this idler arm.

Spin It — Malleable's ductility permits the sleeve and end disc in this ball joint to be held in place by spinning the Malleable housing into a strong, permanent flange.

Low Cost Computer for the Steel Industry

A sophisticated low-priced control computer with capabilities ranging from simple logging to closed-loop control, the TRW-330 brings you a new standard in flexibility. You can start with a small basic system that matches your current requirements and then add capabilities as you need them.

Thompson Ramo Wooldridge has successfully installed more digital control computers than any other manufacturer. Because TRW-330 design is based on this experience, you are assured that a TRW-330 system offers the greatest value per dollar in computer hardware – in flexibility, reliability, efficiency.

TRW-330 FLEXIBILITY – Memory sizes range from 4,000 to over 100,000 words; analog input capacity from 0 to over 1,000; an optional subsystem permits automatic scanning and alarm functions to proceed independently of the computer's control program. A similar degree of flexibility is afforded by the TRW-330's analog-output system, priority interrupt circuits, digital input-output equipment, fast-access storage, and command structure.

TRW-330's are supplied in cabinets that match the application: rugged cabinets for harsh industrial environment, air purgable cabinets for hazardous environment, or standard control-room cabinets.

TRW-330 CAPABILITIES – TRW-330 computing speeds exceed those of competitively priced machines; addition instructions can be performed in 260 microseconds, including access time.

TRW Computers Company

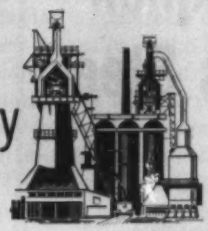
a division of **Thompson Ramo Wooldridge Inc.**

TO FIND OUT HOW THE TRW-330 CAN BE APPLIED TO YOUR CONTROL PROBLEM, CONTACT ANY OF THE TRW COMPUTERS COMPANY OFFICES LISTED BELOW.

220 North Canon Drive	1510 Esperson Building	200 East 42nd Street	200 South Michigan Avenue	3272 Peachtree Road, N.E.
BEVERLY HILLS, CALIFORNIA	HOUSTON, TEXAS	NEW YORK 17, NEW YORK	CHICAGO, ILLINOIS	ATLANTA 5, GEORGIA

13-90

The TRW-330 in the Steel Industry



A TRW-330 digital computer will control the basic oxygen furnaces at Great Lakes Steel Corporation, Detroit division of National Steel Corporation. Given raw-material data and end-product specifications, the TRW-330 will compute and control additive requirements and control the flow rate and duration of the oxygen blow. By correlating data on finished ingot characteristics with records of furnace operation, the TRW-330 will automatically determine the best set of operating conditions for subsequent batches. TRW-330 control will minimize the consumption of raw materials and will ensure product quality.

A TRW-330 can control many other conversion and finishing operations. It can be applied to any control job – large or small – and you pay for only as much computing and control capacity as you need because the TRW-330 is flexible in size. You can later expand your system for data logging and closed-loop control of additional plant operations.

The TRW-330 is ideal for an "evolutionary" control system. The basic computer provides you an economical means of gathering and interpreting data on the operation of a specific process. From this information, a closed-loop control system can be developed, and your TRW-330 can be expanded to do the job while gathering information on other processes. Thus, TRW-330 expandability gives you a gradual, or evolutionary extension of automatic control.

Investigate the TRW-330 in the light of your own requirements today.

TRW Computers Company

a division of Thompson Ramo Wooldridge Inc.

8433 FALLBROOK AVENUE, CANOGA PARK, CALIFORNIA

NEW PRODUCTS and equipment

2 in. radius bend without rupture.

For further information, *write* Extruded Alloys Inc., 800-900 X St., Bedford, Ind.

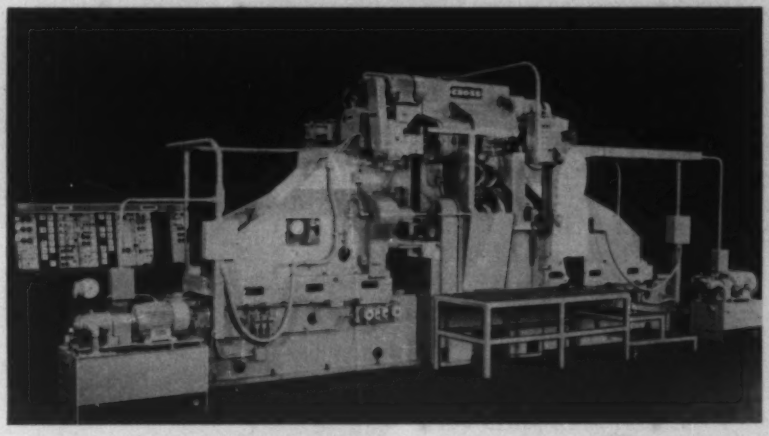
Compact Design Stressed In Electric Fork Truck

A COMPACT, electric lift truck designed by Baker has a 59 in. turning radius and a right angle stacking aisle dimension of 70⅜ in. plus the length of the load.

The truck (Model FTD-020) is designed for easy servicing and heavy duty operation. It's powered by an 18 cell, 15 plate, bobtail battery providing 36 volts. Other features include recirculating, ball type, steering gear and brake efficiency that permits easy stops on 15 per cent grades.

Operator comfort is boosted by a contoured seat (adjustable) of molded foam rubber. The truck is 33¼ in. wide, 102⅛ in. long (with standard 36 in. forks), and 83 in. high with a 130 in. lift mast. Provision for a 10 degree forward and backward mast tilt is standard.

For further information, *write* Baker Industrial Trucks Div., Otis Elevator Co., 8000 Baker Ave., Cleveland, Ohio.



Trunnion Unit Adaptable to Part Changes

THIS ten station trunnion machine does rough, semifinish, and finish boring, and facing of tractor accessory cylinders. Drilling, counterboring, chamfering, tapping, and grooving operations are also performed. The manufacturer says the unit can be easily adapted to future part changes.

Two main heads and four auxiliary heads carry all cutting tools. Similar operations such as boring, drilling, counterboring, and chamfering are performed by spindles carried in the main heads. Dissimilar operations are done by auxiliary heads.

You can accommodate different cylinder lengths by changing some of the tools, replacing a few fixture details, and by adjusting the feed strokes (by means of dogs). Speeds and feeds are adjustable.

For further information, *write* Cross Co., Park Grove Station, Detroit 5, Mich.

U. S. Steel Supply's Liberatore: missile makers and milkmen depend on his Stainless Steel

Order your Stainless Steel from a Stainless Steel Service Center.

Jack Liberatore, sales manager of U. S. Steel Supply's San Francisco Service Center, likes to compare his operation to a grocery store. "We carry a lot of staples, like beans and bacon, but then we carry a few special items, like caviar, too." He's speaking of his Stainless Steel inventory. "Beans" are commonly used sizes and grades; "caviar" refers to special items, sizes and grades for out-of-the-ordinary requirements.

A "caviar" customer of USS Supply's San Francisco operation is the Lox (for liquid oxygen) Equipment Company of Livermore, California. Lox began small with some 20 men on the payroll. They landed a government contract to manufacture vessels to store liquid oxygen, used to power Titan missiles. The payroll immediately went up to 250 men and Lox placed the largest single order ever handled by the U. S. Steel Supply Division at one time.

Lox's requirement added up to a whopping challenge. The contract called for the firm to build 180 vessels, which were to be buried on the missile bases, including 36 each of five different sizes. The largest was a 26,000-gallon vessel 12 feet in diameter and 58 feet long. Lox had about twelve months to do the job. Thanks to lots of help from Jack Liberatore, they met the deadline.

Liberatore expedited the needed steel from U. S. Steel in Pittsburgh. Lox put on three shifts, opened a second plant in Oakland, and began 7-days-a-week operations. Robert Hampton, (above) owner of Lox Equipment Company, put in 17-hour days for a major part of the twelve months. New equipment had to be bought and installed—including a Lox-developed vacuum system using electronic leak detectors.

At first they fell behind schedule. Liberatore fed Lox enough specially cut Stainless Steel plates, and Lox moved ahead of schedule. They delivered the last shipment in November, 1960, eight days ahead of the agreed date. Government officials told Hampton it was the largest amount of equipment of its kind ever produced in such a short time.

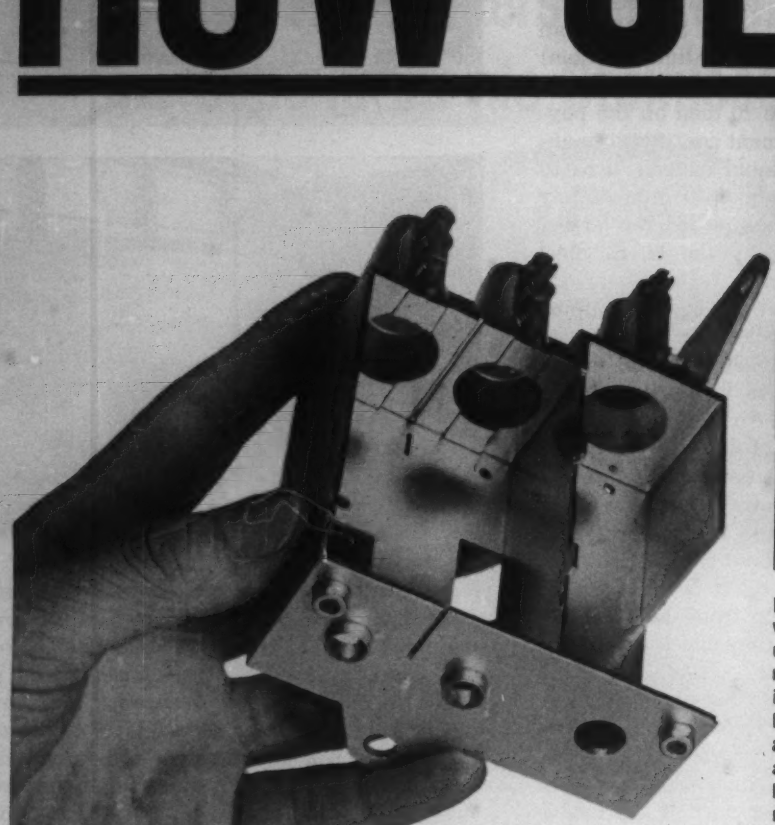
Here are some of the problems USS Supply and Lox met and overcame: the tanks were cylindrically shaped, like a railroad tank car, to be buried horizontally. They had to be "vacuum-jacketed" and able to withstand a wide range of pressures and temperatures—all the way down to −320°F for tanks holding liquid nitrogen. They had to be strong enough to take tremendous

forces—the calculated force a nuclear bomb striking a few miles away would exert on the underground vessels. Solution: a carbon steel outer jacket and a Stainless Steel inner shell. Why Stainless? For corrosion resistance and impact strength at low temperatures. A layer of insulation was inserted between the inner and outer jackets, making a sort of giant Thermos bottle that had to withstand high pressure and low temperatures without leaking (hence the electronic leak detectors). It takes about five months to build one of Lox's tanks.

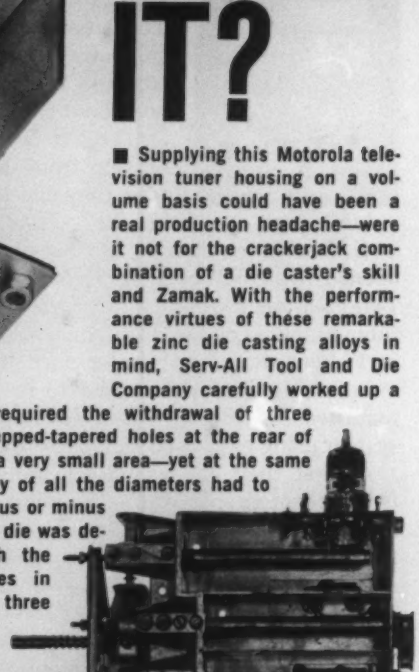
Granted, Lox's problems were unusual, bigger than most. We use it here as an example of the many services provided by Stainless Steel Service Centers. For many firms, Steel Service Centers provide a nearby Stainless Steel inventory, with facilities to deliver any size shapes to order —on time. Most Stainless Steel Service Centers also offer technical and metallurgical help to their customers. U. S. Steel Supply's San Francisco Service Center supplies Stainless Steel to everyone from missilemen to milkmen. Fabricators and manufacturers have come to depend on their service, just as they rely on the strength, corrosion resistance, ease of fabrication and attractive appearance of USS Stainless Steel.

USS TRADEMARK **United States Steel**

HOW eLSe WOULD YOU MAKE IT?



■ Supplying this Motorola television tuner housing on a volume basis could have been a real production headache—were it not for the crackerjack combination of a die caster's skill and Zamak. With the performance virtues of these remarkable zinc die casting alloys in mind, Serv-All Tool and Die Company carefully worked up a unique die. It required the withdrawal of three cores for the stepped-tapered holes at the rear of the casting into a very small area—yet at the same time the accuracy of all the diameters had to be held within plus or minus .002". A piercing die was designed to punch the quarter-inch holes in the housing's three "ears" as well as several undercuts impossible to cast. These holes were also held to plus or minus .002". ■ Serv-All knew Zamak could give them the castability they needed, could meet the demanding tolerances, could provide the high-strength, thin-wall sections required, and had the ductility for an accurate, easy piercing operation after casting. They also knew of the overall production economies inherent to Zamak—low die cost, long die life and high production speeds. One other characteristic of Zamak sealed the choice—the wide variety of finishing procedures which can be used. In this case the housing is copper-plated to facilitate soldering.



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NEW literature

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Commercial Standards

Lists of commercial standards revised to June 1, 1961, and simplified practice recommendations revised to July 1, 1961, have been published. Also available is a pamphlet, *Commodity Standards, What They Are—How They Are Done—Why They Are Used.* Ask for *Catalog No.* 978, *List of Commercial Standards*, and *Catalog No.* 979, *List of Simplified Practice Recommendations*, and commodity standards pamphlet. Commodity Standards Division, U. S. Department of Commerce, Washington 25, D. C.

Metal Show Program

A 12 page brochure gives advance information on technical sessions of the American Society for Metals and nine participating societies at the ASM Metal Show, Cobo Hall, Detroit, Oct. 23-27. It includes return cards for advance registration and hotel reservation. American Society for Metals, Metals Park, Novelty, Ohio.

Gasket Materials

A booklet (AD-190) discusses the selection and specification of gasket material. Garlock Inc., Palmyra, N. Y.

Plastic Sleeve Bearings

Design factors for plastic sleeve bearings are discussed in a six page reprint. It offers criteria for designing bearings for applications in adverse abrasive or corrosive conditions or in nonlubricated or silent bearings. Discussed are material selection, limiting loads and speeds, fit and clearance, effects of temperature, cold flow, and recommended configurations. Cadillac Plastic & Chemical Co., a division of Dayco Corp., 15111 Second Ave., Detroit 3, Mich.

Bearing Nomenclature

Bearing Parts and Nomenclature of Standard and Precision Bearings includes a discussion of ball installation, dimensions, loads, alignment, types and functions of self-aligning, nonself-aligning, and thrust bearings. Bearing accessories such as shields, seals, snap rings, seats, and housings are also discussed. Ask for Form No. 343. SKF Industries Inc., Front Street & Erie Avenue, Philadelphia 32, Pa.

Casters and Wheels

Factors in selecting casters and wheels and mounting arrangements are included in a 48 page brochure. Two pages are devoted to terminology. Hamilton Caster & Mfg. Co., 1700 Dixie Highway, Hamilton, Ohio.

Industrial Photography

Included in a 24 page brochure is a "Darkroom Tips" section. It tells how to handle engineering drawing reproductions and intermediates and provides a comparison chart on more than 30 contact and projection papers and films available for engineering, graphic arts, or other industrial and commercial uses. Anken Chemical & Film Corp., Newton, N. J.

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Outlook Bright for September

STEELMAKERS will produce and ship more metal in September than they've turned out in any month since April, 1959. The only thing that can upset that prediction is a strike in the automotive industry—and that's not expected.

Leading producers from one end of the country to the other are booking new orders at the highest sustained rate in more than a year. For a week or two last May, sales were at an equally brisk pace—thanks to a late surge in automotive demand—but they fell as abruptly as they had risen. Today, there's clear evidence of a trend toward stronger demand—and it's gaining momentum. Result: September production should exceed 9 million ingot tons and may be as much as 10 per cent higher than the 8.6 million tons that STEEL estimates the industry will pour in August.

STRENGTH ACROSS BOARD—Sales executives are particularly encouraged because the pickup is coming at a time when their biggest customers, the automakers, are hardly buying at all. The car companies have enough steel on hand to start production of their 1962 models, and they don't want to order more until they've settled with Walter Reuther. When a new contract is signed, they'll come into the market with a rush. They're planning to build nearly 500,000 cars next month (vs. 180,000 in August).

AUTO SALES OUTLOOK BRIGHT— Steelmen are optimistic about fourth quarter demand from the automotive industry for these reasons: 1. Dealer inventories have been trimmed to a manageable 790,000 cars—down sharply from the year ago level of 1,060,000. 2. The Federal Reserve Board's latest survey of consumer buying intentions shows that the number of families planning in July to buy new cars was the highest in at least three summers.

OTHER SIGNS OF STRENGTH—Also encouraging to steelmakers is the Federal Reserve Board's latest report on industrial production. The seasonally adjusted index of factory, mine, and utility output climbed to a record high in July: 112 per cent of the 1957 average. Orders received by manufacturers of durable goods in July resumed their upward trend and were the highest in two years.

INVENTORIES TO RISE—Prospects for better steel demand in the fall are also strengthened by the likelihood that consumers will increase their inventories. Alan Greenspan, New York economic consultant, believes that users will add 2 million to 3 million tons of steel to their stockpiles in the fourth quarter so that they can sustain higher rates of production.

LABOR SECRETARY WATCHED—The extent to which steel consumers increase their inventories in the first half of 1962 may well be influenced by the role that the government takes in the auto industry's labor negotiations. If there's a strike and if Labor Secretary Arthur Goldberg ends it quickly, steel buyers may figure that they won't have to do much hedging against the possibility of a steel strike next June.

PRODUCTION RISES—Look for ingot production in the week ending Sept. 2 to exceed 2 million tons for the first time since early June. U. S. Steel Corp. will resume melting at its Edgar Thomson Works, Braddock, Pa., after a 14 month suspension. STEEL estimates that industry production in the week ended Aug. 26 was 1,980,000 ingot tons, up 1.9 per cent from the previous week's output.

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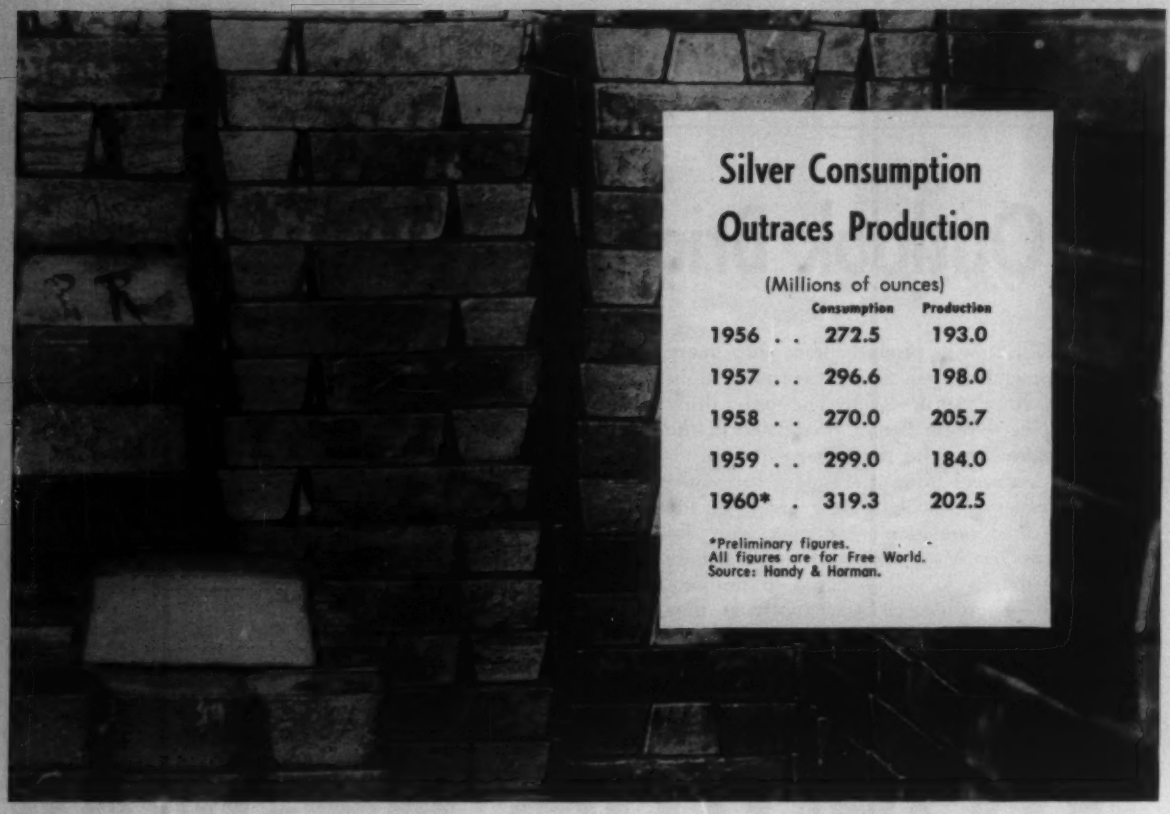


Silver Consumption Outraces Production

(Millions of ounces)

	Consumption	Production
1956 . .	272.5	193.0
1957 . .	296.6	198.0
1958 . .	270.0	205.7
1959 . .	299.0	184.0
1960* .	319.3	202.5

*Preliminary figures.
All figures are for Free World.
Source: Handy & Harman.

Silver Outlook:

No Shortage, but It May Cost More

SILVER is in the headlines again. Within recent weeks it has been cause for fiery speeches in Congress, pressures on the Treasury Department for a change in policy, and a barrage of public statements from representatives of producers and consumers.

At the core of the excitement is a classic example of what eventually happens when a government, regardless of its good intentions interferes with a free market. The story is this: Silver has not operated in a free market since 1933 when the government began to slip a floor price under it. In 1946, lawmakers went a step farther and, in effect, put a ceiling price on the metal. The price Treasury pays is 90.5 cents an ounce. This is derived from a coinage value of $1.2929 an ounce, less 30 per cent (as specified by an act of Congress) for services performed by the Treasury relative to the coinage and delivery of silver dollars.

• **Where It Goes**—Seventy per cent of the purchases are held to back up silver certificates and the remaining 30 per cent go into the so-called free stocks. In the 1946 law, Congress gave Treasury the right to sell free stocks to consumers at no less than 90.5 cents an ounce. (Treasury sells at 91 cents; adding freight, it would be delivered in New York from the San Francisco mint for 91.625 cents an ounce.) Since Treasury has seen fit to exercise this discretionary right, the producer price can't be any higher simply because customers would flock to Treasury for their metal.

• **Free Stocks Drop**—Since 1946, Treasury has sold 101 million ounces of silver to users. The U. S. has also used it for coinage. The result: Free stocks dropped from 175 million ounces on Dec. 30, 1959, to 123 million on Dec. 30, 1960. They're now about 78 million.

Meanwhile, consumption has been rising much faster than production. In no year since World War II

has Free World silver output equaled demand. The difference has been met by drawing on U. S. government stocks and those of other nations like Great Britain.

• **Day of Reckoning**—In about a year, Treasury free stocks will be exhausted. With this artificial brake removed, the price is sure to rise. How far and how fast are the questions in silver circles.

Producers want Treasury to raise the price at which it sells silver (under the law it has the power to do it). If a series of orderly price progressions is put into effect now, more metal will become available, and the chances of a runaway market when free stocks are exhausted will be lessened, they reason. A higher price would stimulate production, encourage exploration for new deposits, and, most of all, tempt silver from sources other than primary production, says Simon Strauss, vice president, American Smelting & Refining Co., a leading silver producer.

• **Want Repeal**—Major consumers (Handy & Harman has been the leading spokesman) want all silver legislation repealed, so a free market can be established. Consumers also believe a higher price is needed to bring out silver. But as Handy & Harman's president, Judson C. Travis, puts it: "As long as the Treasury is required by law to buy silver from producers, we don't think it should stop selling or raise the price to consumers."

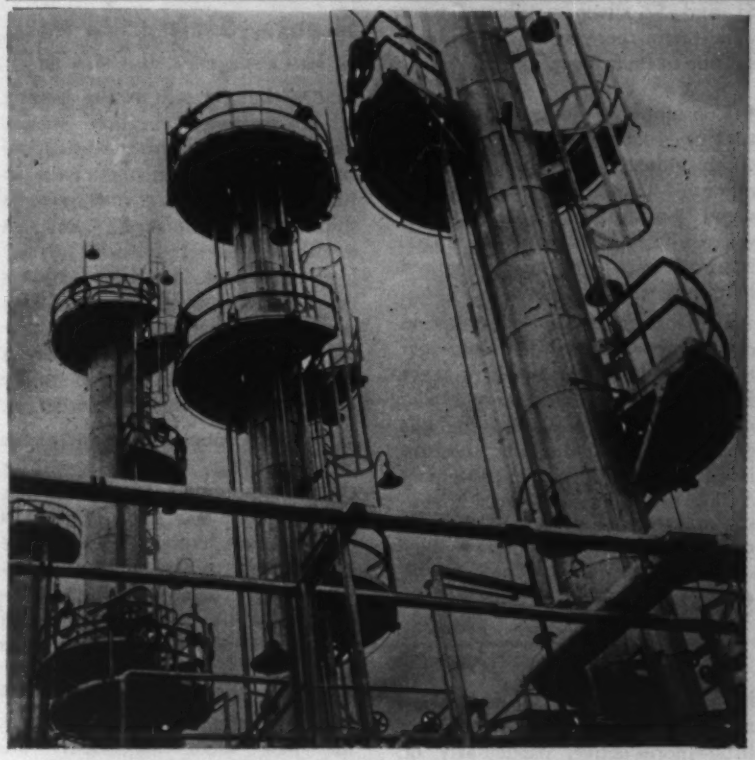
• **Won't Change**—The Treasury will not change its policy of selling at 91 cents an ounce, says Dr. Leland Howard, acting director, Bureau of the Mint. Treasury doesn't believe it should be the one to initiate a price change. Says Dr. Howard: "To deliberately change the price is one thing. To let nature take its course is another."

It's a safe bet that silver will cost more within a year. And with the consumption curve steadily rising, it's highly unlikely that there will be any price weakness for a long time. Mr. Strauss believes the price will probably settle at $1 to $1.10 an ounce.

• **Supply Adequate**—Though consumers will be paying more for silver, there will be an adequate supply to take care of industrial usage. Historically, more silver becomes available when the price rises. The bulk of new silver (60 to 70 per cent) is a byproduct of copper, lead, and zinc operations, so a higher silver price wouldn't bring out any more metal here. A few mines that primarily produce silver might be reopened (it's not economical to operate them at the current price), but that production would be small. It's possible that new mines might be opened, but that would take several years.

The big increase would come from secondary sources, such as demonetized coins and from private citizens of other nations who traditionally hoard silver. One of the big questions, for example, is how much silver the Chinese Communists can squeeze out of peasants. One source believes China could supply as much as 40 million ounces during the course of this year.

• **Limit on Price**—Regardless of what happens in the market, the price could not rise above $1.29 an ounce. At this level, silver certifi-



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cates could be redeemed for metal. The Treasury holds about 1.7 billion ounces of silver to back silver certificates (an additional 115 million ounces are silver dollars in use). If the price ever goes to $1.29 an ounce, silver certificates in denominations of $5 and up could be retired and Federal Reserve notes issued in their place (about 500 million ounces of silver back up these certificates). One obstacle stands in the way of retiring $1 and $2 bills. The law does not allow a Federal Reserve note to be issued in denominations under $5. So if $1 and $2 silver certificates were withdrawn, there would be nothing to issue in their place.

• **Consumption Going Up**—Industrial usage of silver will continue to climb, industry people believe. Photographic uses are requiring more metal. So are metal joining and electrical-electronic applications. More silver is going into specialized batteries.

U. S. industrial consumption dipped about 3 per cent last year to 100 million ounces. During the first half of this year, usage was not as high as it was in the like period of 1960. But the industry looks for a significant improvement during the second half, raising consumption for the year close to what it was in 1960.

Steel Bars . . .

Bar Prices, Page 105

Purchasers of steel bars have been placing some tonnage right along and demand seems to be a little more active, particularly on miscellaneous account, but the mills say only a pickup in automotive buying will push operations up noticeably. Little hedge buying against an increase in prices this fall is noted.

Some buyers are finding it more difficult to obtain early rollings, though delivery promises still range two to four weeks. In the Midwest, demand for hot rolled bars appears to have diminished somewhat. That's because the service centers and cold drawers have shortened their intakes. Sluggishness in cold drawn bars is chiefly attributed to continued slow automotive demand.

Recent elimination of cutting charges on cold finished bars over 5 ft long by Jones & Laughlin Steel Corp., Pittsburgh, may save some buyers as much as $6 to $8 a ton. Customers who have screw machines with automatic feeds stand to gain by the move (they require exact lengths), but industry sources are wondering what effect the action will have on service centers.

A sales executive at one bar mill told STEEL he believes that the distributors will find it necessary to waive cutting extras—otherwise users who want 400 lb orders will go directly to the mills.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 106 & 107

Sheet buying reflects the passing of the summer vacation season. Over-all bookings of the mills are running better than they were in July. A Midwestern mill says its shipments of finished steel this month will better those in July by 5 to 6 per cent. Its sheet bookings in the week ended Aug. 19 were markedly higher than in the preceding week. That is considered as an indication that consumers are looking farther ahead in ordering.

Household appliance requirements are increasing. So are needs for shipping containers, office furniture, and miscellaneous uses. There's a little cautious buying on automotive account, but volume awaits the settlement of current labor negotiations. The auto builders are thought to be holding enough steel to get a good start on the 1962 model cars. But most steelmakers think there'll be a buying surge just as soon as the new labor agreements are negotiated.

Mill deliveries are tightening slightly. There are fewer promises on cold rolled under four to five weeks, and fewer on hot rolled under three weeks. Some producers of continuous galvanized sheets are virtually booked up through October. In such specialties as electrical sheets and enameling stock, deliveries are lengthening a little.

Inland Steel Co., Chicago, is testing out its open coil annealing system just completed at its No. 3 cold strip mill at the Indiana Harbor Works, East Chicago, Ind. The system was installed primarily for production of enameling steel from normal carbon sheet steel.

Distributors . . .

Prices, Page 112

Steel service centers report a mild pickup in demand for steel. Improvement is confined largely to the hot rolled carbon grades.

Distributors maintain well balanced stocks. They say deliveries are readily available from mills on most products.

Prices are soft in a highly competitive market.

Tin Plate . . .

Tin Plate Prices, Page 107

Tin plate demand is disappointing. Sales have not come up to expectations. Explanation: Some packs are late this year. Also, some canmakers appear to be having problems with the thinner plate. They're undecided whether to use the new light plate or the standard material and are limiting their buying pending a decision. Mill inventories are heavy.

The movement of tin plate cans in June totaled 450,676 tons vs. 415,674 in May, reports the Census Bureau. Shipments in the first six months this year totaled 2,192,888 tons vs. 2,120,867 in the like 1960 period. Base boxes consumed in June amounted to 9,812,998 against 9,086,946 in May.

Aluminum cans totaled 2412 tons in June vs. 3705 in May. The movement in the first six months this year was 18,040 tons, up sharply from the 9977 tons moved in the same period a year ago.

Development of Ferrolite 10, a new grade of lighter, thinner tin plate than the present Ferrolite was announced last week by U. S. Steel Corp. The new grade, priced 15 cents per base box lower in all basis weights than the present Ferrolite, has a coating of 1/10 lb of tin per base box. Ferrolite heretofore was produced in one grade only, with 1/4 lb of tin coating per base box.

The West Coast market is enlivened by reports that Welsh tin plate will begin flowing to two U. S. can companies in October. It's reported the Steel Co. of Wales will supply regular shipments to American Can Co. and Continental Can Co., first shipments of better than 10,000 tons being scheduled for West Coast ports in October and November.

Steel Production Rises for Fourth Consecutive Week

STEEL INGOT production has risen for four consecutive weeks and is expected to attain still higher levels in September. STEEL estimates output for the week ended Aug. 26 at 1,980,000 tons compared with 1,944,000 tons for the preceding week.

Steel ordering is accelerating, offering twofold encouragement to mills: 1. It gives assurance September will be a good month, barring an unexpected interruption to automobile production resulting from a contract stalemate. 2. Users are ordering a little farther ahead.

A small part of the current increase in production is attributed to accumulation of semifinished steel stocks by mills. With increased business volume certain for the balance of this year, mills are seeking to bolster the working inventory. Not mentioned by the mills, but nevertheless important, such inventory can be laid down at a lower cost now than after Oct. 1 when the wage increase for steelworkers goes into effect.

• **Chicago**—Steelmaking operations here held at the 71 per cent of 1960 capacity level for the week ended Aug. 26. Expanded operations at several smaller mills were offset by dips at larger plants.

• **Youngstown** — The steelmaking rate rose 2 points during the week ended Aug. 26 to 58 per cent of 1960 capacity. Republic Steel Corp. added a fifth open hearth at its Brier Hill Works. That brought the district's list of active furnaces to 35 open hearths and 1 bessemer.

• **Buffalo**—Steel production has advanced with the lighting of an open hearth at the plant of Wickwire Spencer Steel Div., Tonawanda, N. Y., Colorado Fuel & Iron Corp. Wickwire is operating two of its three open hearths, the best level in several months. The district rate for the week ended Aug. 26 rose 2½ points to about 56 per cent of 1960 capacity.

• **Philadelphia** — Uptrend in the Northeast district continues. Output in the week ended Aug. 26 surpassed that for the week ended Aug. 19 when the AISI index was 114, up 7 points from the previous week.

• **Birmingham** — The steelmaking rate for the Birmingham-Gadsden-Atlanta area of the Southern District eased 1 point to 65 per cent of 1960 capacity during the week ended Aug. 26.

• **Los Angeles** — Steel production in the Western District is holding at about 75 per cent of 1960 capacity. Leading mills report no change, or only slight ones, in their operating schedules.

• **Cleveland** — Production rose slightly above the 100,000 ton level during the weeks ended Aug. 19 and Aug. 26. That is the best level recorded since the week ended July 15.

• **Pittsburgh**—Steelmaking operations are on the uptrend here. U. S. Steel Corp. has added an open hearth at its Duquesne (Pa.) Works. Ingot output in the week ended Aug. 26 is estimated at 371,000 tons (about 62.5 per cent of 1960 capacity), up from 363,194 tons in the previous week. Further gains are expected in the week ending Sept. 2 as U. S. Steel reactivates 5 of 16 open hearths at its Edgar Thomson Works, Braddock, Pa.

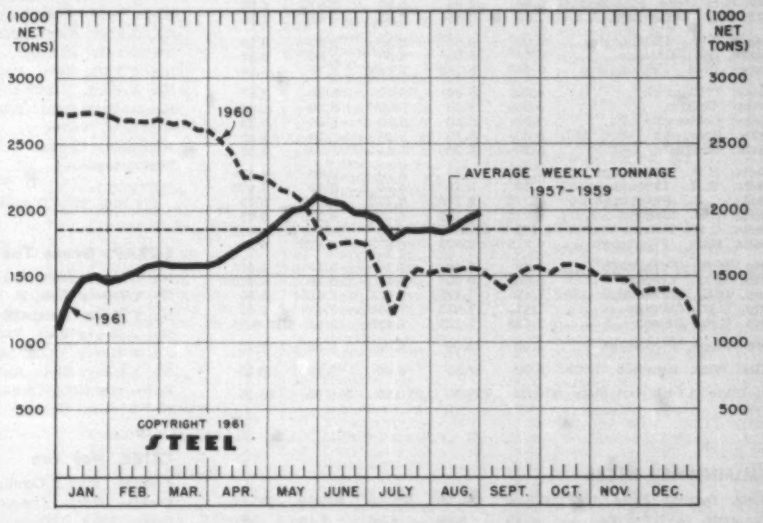
• **Cincinnati**—Steel production in the week ended Aug. 26 increased slightly. A repaired furnace is back in operation at one works. The operating rate is up about 3 points to 70 per cent of 1960 capacity.

STEEL INGOT PRODUCTION

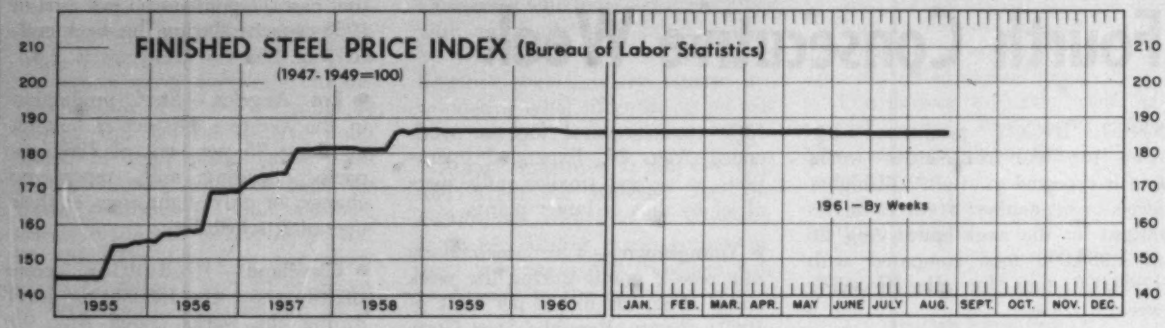
Weeks Ended	Net Tons	Change
Aug. 26	1,980,000*	+ 1.9%
Aug. 19	1,944,000	+ 1.8%
Aug. 12	1,910,000	+ 3.2%
Totals to Aug. 19		
1961	58,090,000	−17.9%
1960	70,755,000	

DISTRICTS	Week Ended —Aug. 19— Tons‡	Index†	Week Ended Aug. 12 Index†
Northeastern	304,603	114	107
Buffalo	87,620	90	86
Pittsburgh	363,194	90	94
Youngstown	163,182	96	94
Cleveland	100,929	109	104
Detroit	134,294	128	119
Chicago	396,521	106	105
Cincinnati	82,191	109	120
St. Louis	60,433	115	107
Southern	119,236	110	105
Western	134,450	115	108
Industry	1,944,000	104.4	102.5

*Estimated by STEEL.
†1957-59 (1,862,933 tons) = 100.
‡District tonnages are approximate and will not necessarily add to the national total.



Price Indexes and Composites



Aug. 22, 1961	Week Ago	Month Ago	Aug. Index	Year Ago
185.6	185.6	185.6	185.6	186.2

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Aug. 22

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.825	Bars, H.R., Carbon	6.675
Rails, Light, 40 lb	7.292	Bars, Reinforcing	(N.A.)
Tie Plates	6.875	Bars, C.F., Carbon	10.710
Axles, Railway	10.175	Bars, C.F., Alloy	14.125
Wheels, Freight Car, 33 in. (per wheel)	62.000	Bars, C.F., Stainless, 302 (lb)	0.570
Plates, Carbon	6.350	Sheets, H.R., Carbon	6.350
Structural Shapes	6.167	Sheets, C.R., Carbon	7.300
Bars, Tool Steel, Carbon (lb)	0.560	Sheets, Galvanized	8.775
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.680	Sheets, C.R., Stainless, 302 (lb)	0.643
Bars, Tool Steel, H.R. Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.060 (lb)	1.460	Sheets, Electrical	12.625
Bars, Tool Steel, H.R. Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.895	Strip, C.R., Carbon	9.225
Bars, H.R., Alloy	10.775	Strip, C.R., Stainless, 430 (lb)	0.460
Bars, H.R., Stainless, 303 (lb)	0.543	Strip, H.R., Carbon	6.250
		Pipe, Black, Buttweld (100 ft)	19.495
		Pipe, Galv., Buttweld (100 ft)	23.098
		Pipe Line (100 ft)	195.423
		Casing, Oil Well, Carbon (100 ft)	193.028
		Casing, Oil Well, Alloy (100 ft)	302.650
		Tubes, Boiler (100 ft)	51.200
		Tubing, Mechanical, Carbon (100 ft)	27.005
		Tubing, Mechanical, Stainless, 304 (100 ft)	192.285
		Tin Plate, Hot-dipped, 1.25 lb (95 lb base box)	10.100
		Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.800
		Black Plate, Canmaking Quality (95 lb base box)	7.900
		Wire, Drawn, Carbon	10.575
		Wire, Drawn, Stainless, 430 (lb)	0.665
		Bale Ties (Bundles)	7.647
		Nails, Wire, 8d Common	9.433
		Wire, Barbed (80-rod spool)	8.372
		Woven Wire Fence (20-rod roll)	20.910

STEEL's FINISHED STEEL PRICE INDEX

	Aug. 23 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg = 100)	247.82	247.82	247.82	247.82	225.71
Index in cents per lb	6.713	6.713	6.713	6.713	6.114

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT	$149.96	$149.96	$149.96	$149.96	$137.59
No. 2 Fdry, Pig Iron, GT	66.49	66.49	66.49	66.49	62.63
Basic Pig Iron, GT	65.99	65.99	65.99	65.99	62.18
Malleable Pig Iron, GT	67.27	67.27	67.27	67.27	63.41
Steelmaking Scrap, GT	38.33	38.33	37.00	32.67	58.17

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Aug. 23 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.675	5.675	5.675	5.675	5.075
Bars, H.R., Chicago	5.675	5.675	5.675	5.675	5.075
Bars, H.R., deld., Philadelphia	5.98	5.98	5.98	5.975	4.93
Bars, C.R., Pittsburgh	7.65	7.65	7.65	7.65	6.85
Shapes, Std., Pittsburgh	5.50	5.50	5.50	5.50	5.00
Shapes, Std., Chicago	5.50	5.50	5.50	5.50	5.00
Shapes, deld., Philadelphia	5.745	5.745	5.745	5.77	5.00
Plates, Pittsburgh	5.30	5.30	5.30	5.30	4.85
Plates, Chicago	5.30	5.30	5.30	5.30	4.85
Plates, Coatesville, Pa.	5.30	5.30	5.30	5.30	5.25
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.30	4.85
Plates, Claymont, Del.	5.30	5.30	5.30	5.30	5.35
Sheets, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.675
Sheets, H.R., Chicago	5.10	5.10	5.10	5.10	4.675
Sheets, C.R., Pittsburgh	6.275	6.275	6.275	6.275	5.75
Sheets, C.R., Chicago	6.275	6.275	6.275	6.275	5.75
Sheets, C.R., Detroit	6.275	6.275	6.275	6.275-6.375	5.75-5.85
Sheets, Galv., Pittsburgh	6.875	6.875	6.875	6.875	6.30
Strip, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.675
Strip, H.R., Chicago	5.10	5.10	5.10	5.10	4.675
Strip, C.R., Pittsburgh	7.425	7.425	7.425	7.425	6.85
Strip, C.R., Chicago	7.425	7.425	7.425	7.425	6.85
Strip, C.R., Detroit	7.425	7.425	7.425	7.425	6.35-6.95
Wire, Basic, Pittsburgh	8.00	8.00	8.00	8.00	7.20
Nails, Wire, nonstock, Pitts.	8.95	8.95	8.95	8.95	8.35
Tin Plate (1.50 lb) box, Pitts.	$10.65	$10.65	$10.65	$10.65	$9.85

SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$99.50	$99.50	$99.50	$99.50	$91.50
Wire rods, $\frac{7}{32}$-$\frac{9}{16}$" Pitts.	6.40	6.40	6.40	6.40	5.80

PIG IRON, Gross Ton	Aug. 23 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pittsburgh	$67.00	$67.00	$67.00	$67.00	$63.50
Basic, Valley	66.00	66.00	66.00	66.00	62.50
Basic, deld., Philadelphia	70.18	70.18	70.18	70.41	66.26
No. 2 Fdry, NevilleIsland, Pa.	66.50	66.50	66.50	66.50	63.00
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	63.00
No. 2 Fdry, deld., Phila.	70.68	70.68	70.68	70.91	66.76
No. 2 Fdry, Birmingham	62.50	62.50	62.50	62.50	59.00
No. 2 Fdry(Birm.), deld., Cin.	70.20	70.20	70.20	70.20	66.70
Malleable, Valley	66.50	66.50	66.50	66.50	63.00
Malleable, Chicago	66.50	66.50	66.50	66.50	63.00
Ferromanganese, net ton†	245.00	245.00	245.00	245.00	215.00

†74-76% Mn, Duquesne, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$35.50	$35.50	$35.50	$31.50	$57.50
No. 1 Heavy Melt, E. Pa.	40.00	40.00	39.00	35.00	58.00
No. 1 Heavy Melt, Chicago	39.50	39.50	36.50	31.50	59.00
No. 1 Heavy Melt, Valley	39.50	39.50	38.50	33.50	64.50
No. 1 Heavy Melt, Cleve.	36.50	36.50	35.50	31.50	62.00
No. 1 Heavy Melt, Buffalo	31.50	31.50	31.50	29.50	56.50
Rails, Rerolling, Chicago	59.50	58.50	58.50	53.50	83.50
No. 1 Cast, Chicago	42.50	42.50	41.50	42.50	53.50

COKE, Net Ton					
Beehive, Furn., Connlsvl.	$16.00	$15.00	$15.00	$15.00	$14.50
Beehive, Fdry., Connlsvl.	18.25	18.25	18.25	18.25	17.50
Owen, Fdry., Milwaukee	32.00	32.00	32.00	32.00	29.50

Steel Prices

Mill base prices as reported to STEEL, Aug. 23, cents per pound except as otherwise noted. *Changes shown in italics.* Code number following mill point indicates producing company. Key to producers, page 106; footnotes, page 108.

SEMIFINISHED

INGOTS, Carbon Forging (NT)
Munhall,Pa. U5 ....$76.00

INGOT, Alloy (NT)
Detroit S41 ....$82.00
Economy,Pa. B14 ....82.00
Farrell,Pa. S3 ....82.00
Lowellville,O. S3 ....82.00
Midland,Pa. C18 ....82.00
Munhall,Pa. U5 ....82.00
Sharon,Pa. S3 ....82.00

BILLETS, BLOOMS & SLABS Carbon Rolling (NT)
Bartonville,Ill. K4 ....$82.00
Bessemer,Pa. U5 ....80.00
Buffalo R2 ....80.00
Clairton,Pa. U5 ....80.00
Ensley,Ala. T2 ....80.00
Fairfield,Ala. T2 ....80.00
Fontana,Calif. K1 ....90.50
Gary,Ind. U5 ....80.00
Johnstown,Pa. B2 ....80.00
Lackawanna,N.Y. B2 ..80.00
Munhall,Pa. U5 ....80.00
Owensboro,Ky. G8 ....80.00
S.Chicago,Ill. R2, U5 ..80.00
S.Duquesne,Pa. U5 ....80.00
Sterling,Ill. N15 ....80.00
Youngstown R2 ....80.00

Carbon, Forging (NT)
Bessemer,Pa. U5 ....$99.50
Buffalo R2 ....99.50
Canton,O. R2 ....102.00
Clairton,Pa. U5 ....99.50
Conshohocken,Pa. A3 ..99.50
Ensley,Ala. T2 ....99.50
Fairfield,Ala. T2 ....99.50
Farrell,Pa. S3 ....99.50
Fontana,Calif. K1 ....109.00
Gary,Ind. U5 ....99.50
Geneva,Utah C11 ....99.50
Houston S5 ....104.50
Johnstown,Pa. B2 ....99.50
Lackawanna,N.Y. B2 ..99.50
LosAngeles B3 ....109.00
Midland,Pa. C18 ....99.50
Munhall,Pa. U5 ....99.50
Owensboro,Ky. C8 ....99.50
Seattle B3 ....109.00
Sharon,Pa. S3 ....99.50
S.Chicago R2, U5, W14 ..99.50
S.Duquesne,Pa. U5 ....99.50
S.SanFrancisco B3 ....109.00
Warren,O. C17 ....99.50

Alloy, Forging (NT)
Bethlehem,Pa. B2 ...$119.00
Bridgeport,Conn. C32 ..119.00
Buffalo R2 ....119.00
Canton,O. R2, T7 ....119.00
Conshohocken,Pa. A3 ..121.00
Detroit S41 ....119.00
Economy,Pa. B14 ....119.00
Farrell,Pa. S3 ....119.00
Fontana,Calif. K1 ....140.00
Gary,Ind. U5 ....119.00
Houston S5 ....124.00
Ind.Harbor,Ind. Y1 ..119.00
Johnstown,Pa. B2 ....119.00
Lackawanna,N.Y. B2 ..119.00
LosAngeles B3 ....139.00
Lowellville,O. S3 ....119.00
Massillon,O. R2 ....119.00
Midland,Pa. C18 ....119.00
Munhall,Pa. U5 ....119.00
Owensboro,Ky. G8 ....119.00
Seattle(6) B3 ....140.00
Sharon,Pa. S3 ....119.00
S.Chicago R2,U5,W14 ..119.00
S.Duquesne,Pa. U5 ..119.00
Struthers,O. Y1 ....119.00
Warren,O. C17 ....119.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 ....$122.50
Canton,O. R2 ....125.00
Cleveland R2 ....122.50
Gary,Ind. U5 ....122.50
S.Chicago,Ill. R2,W14 ..122.50
S.Duquesne,Pa. U5 ..122.50
Warren,O. C17 ....122.50

SKELP
Aliquippa,Pa. J5 ....5.05
Benwood,W.Va. W10 ...5.05
Ind.Harbor,Ind. Y1 ....5.05
Munhall,Pa. P5 ....5.05
Pittsburgh J5 ....5.05
Warren,O. R2 ....5.05
Youngstown R2, U5 ....5.05

WIRE RODS
AlabamaCity,Ala. R2 ...6.40
Aliquippa,Pa. J5 ....6.40
Alton,Ill. L1 ....6.60
Bartonville,Ill. K4 ....6.50
Buffalo W12 ....6.40
Cleveland A7 ....6.40
Donora,Pa. A7 ....6.40
Fairfield,Ala. T2 ....6.40
Houston S5 ....6.65
IndianaHarbor,Ind. Y1 ..6.40
Johnstown,Pa. B2 ....6.40
Joliet,Ill. A7 ....6.40
KansasCity,Mo. S5 ....6.65
Kokomo,Ind. C16 ....6.50
LosAngeles B3 ....7.20
Minnequa,Colo. C10 ....6.65
Monessen,Pa. P7 ....6.40
N.Tonowanda S47 ....6.40
Pittsburg,Calif. C11 ....7.20
Portsmouth,O. P12 ....6.40
Roebling,N.J. R5 ....6.50
S.Chicago,Ill. R2, W14 ..6.40
SparrowsPoint,Md. B2 ..6.50
Sterling,Ill.(1) N15 ....6.40
Sterling,Ill. N15 ....6.50
Struthers,O. Y1 ....6.40
Worcester,Mass. A7 ....6.70

STRUCTURALS

Carbon Steel Std. Shapes
AlabamaCity,Ala. R2 ...5.50
Aliquippa,Pa. J5 ....5.50
Atlanta A11 ....5.70
Bessemer,Ala. T2 ....5.50
Bethlehem,Pa. B2 ....5.55
Birmingham C15 ....5.50
Clairton,Pa. U5 ....5.50
Fairfield,Ala. T2 ....5.50
Fontana,Calif. K1 ....6.30
Gary,Ind. U5 ....5.50
Geneva,Utah C11 ....5.50
Houston S5 ....5.60
Ind.Harbor,Ind. I-2, Y1..5.50
Johnstown,Pa. B2 ....5.55
Joliet,Ill. P22 ....5.50
KansasCity,Mo. S5 ....5.60
Lackawanna,N.Y. B2 ..5.55
LosAngeles B3 ....6.20
Minnequa,Colo. C10 ....5.80
Munhall,Pa. U5 ....5.50
Niles,Calif. P1 ....6.25
Phoenixville,Pa. P4 ....5.55
Portland,Oreg. O4 ....6.25
Seattle B3 ....6.25
S.Chicago,Ill. U5, W14..5.50
S.SanFrancisco B3 ....6.15
Sterling,Ill. N15 ....5.50
Struthers,O. Y1 ....5.50
Torrance, Calif. C11 ....6.20
Weirton,W.Va. W6 ....5.50

Wide Flange
Bethlehem,Pa. B2 ....5.55
Clairton,Pa. U5 ....5.50
Fontana,Calif. K1 ....6.45
IndianaHarbor,Ind. I-2..5.50
Lackawanna,N.Y. B2 ..5.55
Munhall,Pa. U5 ....5.50
Phoenixville,Pa. P4 ....5.55
S.Chicago,Ill. U5 ....5.50
Sterling,Ill. N5 ....5.50
Weirton,W.Va. W6 ....5.50

Alloy Std. Shapes
Aliquippa,Pa. J5 ....6.80
Clairton,Pa. U5 ....6.80
Gary,Ind. U5 ....6.80
Houston S5 ....6.90
Munhall,Pa. U5 ....6.80
S.Chicago,Ill. U5, W14 ..6.80

H.S., L.A., Std. Shapes
Aliquippa,Pa. J5 ....8.05
Bessemer,Ala. T2 ....8.05
Bethlehem,Pa. B2 ....8.10
Clairton,Pa. U5 ....8.05
Fairfield,Ala. T2 ....8.05
Fontana,Calif. K1 ....8.85
Gary,Ind. U5 ....8.05
Geneva,Utah C11 ....8.05
Houston S5 ....8.15
Ind.Harbor,Ind. I-2, Y1 ..8.05
Johnstown,Pa. B2 ....8.10
KansasCity,Mo. S5 ....8.15
Lackawanna,N.Y. B2 ..8.10
LosAngeles B3 ....8.75
Munhall,Pa. U5 ....8.05
Phoenixville,Pa. P4 ....8.10
Seattle B3 ....8.80
S.Chicago,Ill. U5, W14 ..8.05
S.SanFrancisco B3 ....8.70
Sterling,Ill. N15 ....7.75
Struthers,O. Y1 ....8.05

H.S., L.A., Wide Flange
Bethlehem,Pa. B2 ....8.10
Ind.Harbor,Ind. I-2 ....8.05
Lackawanna,N.Y. B2 ..8.10
Munhall,Pa. U5 ....8.05
S.Chicago,Ill. U5 ....8.05
Sterling,Ill. N15 ....7.75

PILING

BEARING PILES
Bethlehem,Pa. B2 ....5.55
Ind.Harbor,Ind. I-2 ....5.50
Lackawanna,N.Y. B2 ..5.55
Munhall,Pa. U5 ....5.50
S.Chicago,Ill. I-2, U5 ...5.50

STEEL SHEET PILING
Ind.Harbor,Ind. I-2 ....6.50
Lackawanna,N.Y. B2 ..6.50
Munhall,Pa. U5 ....6.50
S.Chicago,Ill. I-2, U5 ...6.50
Weirton,W.Va. W6 ....6.50

PLATES

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ...5.30
Aliquippa,Pa. J5 ....5.30
Ashland,Ky.(15) A10 ...5.30
Bessemer,Ala. T2 ....5.30
Clairton,Pa. U5 ....5.30
Claymont,Del. P4 ....5.30
Cleveland J5, R2 ....5.30
Coatesville,Pa. L7 ....5.30
Conshohocken,Pa. A3 ...5.30
Ecorse,Mich. G5 ....5.30
Fairfield,Ala. T2 ....5.30
Farrell,Pa. S3 ....5.30
Fontana,Calif.(30) K1 ..6.10
Gary,Ind. U5 ....5.30
Geneva,Utah C11 ....5.30
GraniteCity,Ill. G4 ....5.40
Houston S5 ....5.40
Ind.Harbor,Ind. I-2, Y1..5.30
Johnstown,Pa. B2 ....5.30
Lackawanna,N.Y. B2 ..5.30
Mansfield,O. E6 ....5.30
Minnequa,Colo. C10 ....6.15
Munhall,Pa. U5 ....5.30
Newport,Ky. A2 ....5.30
Pittsburgh J5 ....5.30
Riverdale,Ill. A1 ....5.30
Seattle B2 ....6.20
Sharon,Pa. S3 ....5.30
S.Chicago,Ill. U5, W14..5.30
SparrowsPoint,Md. B2 ..5.30
Sterling,Ill. N15 ....5.30
Steubenville,O. W10 ....5.30
Warren,O. R2 ....5.30
Youngstown U5, Y1 ....5.30
Youngstown(27) R2 ....5.30

PLATES, Carbon Abras. Resist.
Claymont,Del. P4 ....7.05
Fontana,Calif. K1 ....7.85
Geneva,Utah C11 ....7.05
Houston S5 ....7.15
Johnstown,Pa. B2 ....7.05
SparrowsPoint,Md. B2 ..7.05

PLATES, Wrought Iron
Economy,Pa. B14 ....14.10

PLATES, H.S., L.A.
Aliquippa,Pa. J5 ....7.95
Ashland,Ky. A10 ....7.95
Bessemer,Ala. T2 ....7.95
Clairton,Pa. U5 ....7.95
Claymont,Del. P4 ....7.95
Cleveland J5, R2 ....7.95
Coatesville,Pa. L7 ....7.95
Conshohocken,Pa. A3 ...7.95
Economy,Pa. B14 ....7.95
Ecorse,Mich. G5 ....7.95
Fairfield,Ala. T2 ....7.95
Farrell,Pa. S3 ....7.95
Fontana,Calif.(30) K1 ..8.75
Gary,Ind. U5 ....7.95
Geneva,Utah C11 ....7.95
Houston S5 ....8.05
Ind.Harbor,Ind. I-2, Y1..7.95
Johnstown,Pa. B2 ....7.95
Munhall,Pa. U5 ....7.95
Pittsburgh J5 ....7.95
Seattle B3 ....8.85
Sharon,Pa. S3 ....7.95
S.Chicago,Ill. U5, W14..7.95
SparrowsPoint,Md. B2 ..7.95
Sterling,Ill. N15 ....7.625
Warren,O. R2 ....7.95
Youngstown U5, Y1 ....7.95

PLATES, Alloy
Claymont,Del. P4 ....7.50
Coatesville,Pa. L7 ....7.50
Economy,Pa. B14 ....7.50
Farrell,Pa. S3 ....7.50
Fontana,Calif. K1 ....8.30
Gary,Ind. U5 ....7.50
Houston S5 ....7.60
Ind.Harbor,Ind. Y1 ....7.50
Johnstown,Pa. B2 ....7.50
Lowellville,O. S3 ....7.50
Munhall,Pa. U5 ....7.50
Newport,Ky. A2 ....7.50
Pittsburgh J5 ....7.50
Seattle B3 ....8.40
Sharon,Pa. S3 ....7.50
S.Chicago,Ill. U5, W14..7.50
SparrowsPoint,Md. B2 ..7.50
Youngstown Y1 ....7.50

PLATES, Ingot Iron
Ashland c.l. (15) A10 ..5.55
Ashland l.c.l.(15) A10 ..6.05
Cleveland c.l. R22 ....6.05
Warren,O. R2 ....6.05

FLOOR PLATES
Cleveland J5 ....6.375
Claymont,Del. P4 ....6.375
Conshohocken,Pa. A3 ...6.375
Ind.Harbor, Ind. I-2 ...6.375
Munhall,Pa. U5 ....6.375
Pittsburgh J5 ....6.375
S.Chicago,Ill. U5 ....6.375

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)
Ala.City,Ala.(9) R2 ...5.675
Aliquippa,Pa.(9) J5 ...5.675
Alton,Ill. L1 ....5.875
Atlanta(9) A11 ....5.875
Bessemer,Ala.(9) T2 ...5.675
Birmingham(9) C15 ...5.675
Buffalo(9) R2 ....5.675
Canton,O.(23) R2 ....6.15
Clairton,Pa.(9) U5 ....5.675
Cleveland(9) R2 ....5.675
Ecorse,Mich.(9) G5 ...5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala.(9) T2 ...5.675
Fairless,Pa.(9) U5 ....5.825
Fontana,Calif.(9) K1 ..6.375
Gary,Ind.(9) U5 ....5.675
Houston(9) S5 ....5.925
Ind.Harbor(9) I-2, Y1..5.675
Johnstown,Pa.(9) B2 ..5.675
Joliet,Ill. P2 ....5.675
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ....5.675
LosAngeles(9) B3 ....6.375
Massillon,O.(23) R2 ....6.15
Midland,Pa.(23) C18 ..6.025
Milton,Pa. M18 ....5.825
Minnequa,Colo. C10 ....6.125
Niles,Calif. P1 ....6.375
N.Tonawanda S47 ....5.675
Owensboro,Ky.(9) G8 ...6.025
Pittsburg,Calif.(9) C11..6.375
Pittsburgh(9) J5 ....5.675
Portland,Oreg. O4 ....6.425
Riverdale,Ill.(9) A1 ...5.675
Seattle(9) A24,B3,N15..6.425
S.Ch'c'go(9)R2,U5,W14 5.675
S.Duquesne,Pa.(9) U5..5.675
S.SanFran.,Calif.(9) B3 6.425
Sterling,Ill.(1)(9) N15..5.675
Sterling,Ill.(9) N15 ....5.775
Struthers,O.(9) Y1 ....5.675
Tonawanda,N.Y. B12 ..5.675
Torrance,Calif.(9) C11 ..6.375
Warren,O. C17 ....6.025
Youngstown(9) R2, U5..5.675

BARS, Hot-Rolled Alloy
Aliquippa,Pa. J5 ....6.725
Bethlehem,Pa. B2 ....6.725
Bridgeport,Conn. C32 ...6.80
Buffalo R2 ....6.725
Canton,O. R2, T7 ....6.725
Clairton,Pa. U5 ....6.725
Detroit S41 ....6.725
Economy,Pa. B14 ....6.725
Ecorse,Mich. G5 ....6.725
Farrell,Pa. S3 ....6.725
Fontana,Calif. K1 ....7.775
Gary,Ind. U5 ....6.725
Houston S5 ....6.975
Ind.Harbor,Ind. I-2, Y1..6.725
Johnstown,Pa. B2 ....6.725
KansasCity,Mo. S5 ....6.975
Lackawanna,N.Y. B2 ..6.725
LosAngeles B3 ....7.775
Lowellville,O. S3 ....6.725
Massillon,O. R2 ....6.725
Midland,Pa. C18 ....6.725
N.Tonawanda S47 ....6.725
Owensboro,Ky. G8 ....6.725
Pittsburgh J5 ....6.725
Seattle(6) B3 ....7.825
Sharon,Pa. S3 ....6.725
S.Chicago R2, U5, W14 6.725
S.Duquesne,Pa. U5 ....6.725
Struthers,O. Y1 ....6.725
Warren,O. C17 ....6.725
Youngstown U5 ....6.725

BARS & SMALL SHAPES, H.R. High-Strength, Low-Alloy
Aliquippa,Pa. J5 ....8.30
Bessemer,Ala. T2 ....8.30
Bethlehem,Pa. B2 ....8.30
Clairton,PPa. U5 ....8.30
Cleveland R2 ....8.30
Ecorse,Mich. G5 ....8.30
Fairfield,Ala. T2 ....8.30
Fontana,Calif. K1 ....9.00
Gary,Ind. U5 ....8.30
Houston S5 ....8.55
Ind.Harbor,Ind. Y1 ....8.30
Johnstown,Pa. B2 ....8.30
KansasCity,Mo. S5 ....8.55
Lackawanna,N.Y. B2 ..8.30
LosAngeles B3 ....9.00
Pittsburgh J5 ....8.30
Seattle B3 ....9.05
S.Chicago,Ill. R2, W14..8.30
S.Duquesne,Pa. U5 ....8.30
S.SanFrancisco B3 ....9.05
Sterling,Ill. N15 ....7.925
Struthers,O. Y1 ....8.30
Youngstown U5 ....8.30

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,P.(9) B2 ..5.825
Houston(9) S5 ....5.925
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ....5.675
Sterling,Ill. N15 ....5.775
Sterling,Ill.(1) N15 ...5.675
Tonawanda,N.Y. B12 ..5.675

BAR SIZE ANGLES; S. SHAPES
Aliquippa,Pa. J5 ....5.675
Atlanta A11 ....5.875
Joliet,Ill. P22 ....5.675
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 ....6.375
Pittsburgh J5 ....5.675
Portland,Oreg. O4 ....6.425
SanFrancisco S7 ....6.52
Seattle B3 ....6.425

BAR SIZE ANGLES; S. SHAPES Wrought Iron
Economy,Pa. B14 ....16.45

BAR SHAPES, Hot-Rolled Alloy
Aliquippa,Pa. J5 ....6.80
Clairton,Pa. U5 ....6.80
Gary,Ind. U5 ....6.80
Houston S5 ....7.05
KansasCity,Mo. S5 ....7.05
Pittsburgh J5 ....6.80
Youngstown U5 ....6.80

BARS, C.F. Loaded (Including loaded extra) Carbon
LosAngeles P2, S30 ..11.75*

Alloy
Ambridge,Pa. W18 ....10.175
BeaverFalls,Pa. M12..10.175
Camden,N.J. P13 ....10.35
Chicago W18 ....10.175
Elyria,O. W8 ....10.175
Monaca,Pa. S17 ....10.175
Newark,N.J. W18 ....10.35
SpringCity,Pa. K3 ....10.35

*Grade A; add 0.5c for Grade B.

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....7.65
BeaverFalls,Pa. M12,R2 7.65
Birmingham C15 ....8.10
Buffalo B5 ....7.70
Camden,N.J. P13 ....8.10
Carnegie,Pa. C12 ....7.65
Chicago W18 ....7.65
Cleveland A7, C20 ....7.65
Detroit B5, H5, P17 ....7.85
Detroit S41 ....7.65
Donora,Pa. A7 ....7.65
Elyria,O. W8 ....7.65
FranklinPark,Ill. N5 ....7.65
Gary,Ind. R2 ....7.65
GreenBay,Wis. F7 ....7.65
Hammond,Ind. J5, L2 ...7.65
Hartford,Conn. R2 ....8.15
Harvey,Ill. B5 ....7.65
LosAngeles(49) S30 ....9.10
LosAngeles(49) P2, R2..9.10
Mansfield,Mass. B5 ....8.20
Massillon,O. R2, R8 ...7.65
Midland,Pa. C18 ....7.65
Monaca,Pa. S17 ....7.16
Newark,N.J. W18 ....8.10
NewCastle,Pa.(17) B4 ..7.65
Pittsburgh J5 ....7.65
Plymouth,Mich. P5 ....7.90
Putnam,Conn. W18 ....8.20
Readville,Mass. C14 ....8.20
Seattle(49) S30 ....9.10
S.Chicago,Ill. W14 ....7.65
SpringCity,Pa. K3 ....8.10
Struthers,O. Y1 ....7.65
Warren,O. C17 ....7.65
Waukegan,Ill. A7 ....7.65
Willimantic,Conn. J5 ....8.15
Youngstown F3, Y1 ....7.65

BARS, Cold-Finished Alloy (Turned and Ground)
Cumberland,Md.(5) C19 6.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....9.025
BeaverFalls,Pa. M12,R2 9.025
Bethlehem,Pa. B2 ....9.025
Bridgeport,Conn. C32 ..9.175
Buffalo B5 ....9.025
Camden,N.J. P13 ....9.20
Canton,O. T7 ....9.025
Carnegie,Pa. C12 ....9.025
Chicago W18 ....9.025
Cleveland A7, C20 ....9.25
Detroit B5, P17 ....9.225
Detroit H5, S41 ....9.025
Donora,Pa. A7 ....9.025
Elyria,O. W8 ....9.025
FranklinPark, Ill. N5 ..9.025
Gary,Ind. R2 ....9.025
GreenBay,Wis. F7 ....9.025

Hammond,Ind. J5 L2. .9.025
Hartford,Conn. R2 ....9.325
Harvey,Ill. R5 .....9.025
Lackawanna,N.Y. B3 ..9.025
LosAngeles P2, S30 ...11.00
Mansfield,Mass. B5 ...9.325
Massillon,O. R2, R8 ...9.025
Midland,Pa. C18 .....9.025
Monaca,Pa. S17 .....9.025
Newark,N.J. W18 .....9.20
N.Tonawanda S47 ....9.025
Plymouth,Mich. P5 ...9.225
S.Chicago,Ill. W14 ....9.025
SpringCity,Pa. K3 ....9.20
Struthers,O. Y1 .....9.025
Warren,O. C17 .....9.025
Waukegan,Ill. A7 ....9.025
Willimantic,Conn. J5 ..9.325
Worcester,Mass. A7 ...9.325
Youngstown F3, Y1 ...9.025

BARS, Reinforcing, Billet (To Fabricators)

Atlanta A11 .....5.00
Birmingham C15 .....5.25
Ecorse,Mich. G5 .....5.675
Emeryville,Calif. J7 ..6.425
Fontana,Calif. K1 ....6.375
Ind.Harbor,Ind. Y1 ....5.675
Johnstown,Pa. B2 .....5.675
Joliet,Ill. P22 .....5.675
Kokomo,Ind. C16 .....5.775
Lackawanna,N.Y. B2 ..5.675
LosAngeles B3 .....6.375
Madison,Ill. L1 .....5.475
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ..6.125
Niles,Calif. P1 .....6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 ....6.425
Seattle A24, B3, N14 ..6.425
S.Chicago,Ill. W14 ....5.675
S.SanFrancisco B3 ....6.425
SparrowsPoint,Md. B2 .5.675
Steelton,Pa. B2 .....5.675
Sterling,Ill. (1) N15 ..5.675
Sterling,Ill. N15 .....5.775
Struthers,O. Y1 .....5.675
Tonawanda,N.Y. B12 ..6.10

BARS, Reinforcing, Billet (Fabricated, to Consumers)

Baltimore B2 .....7.42
Boston B2, U8 .....8.15
Chicago U8 .....7.41
Cleveland U8 .....7.39
Johnstown,Pa. B2 .....7.33
Lackawanna,N.Y. B2 ..7.35
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.80
Philadelphia U8 .....7.63
Pittsburgh J5, U8 .....7.35
Seattle A24, B3, N14 ..7.95
SparrowsPoint,Md. B2 ..7.33
St.Paul U8 .....8.17

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 16.10
Economy,Pa.(D.R.)B14 20.50
Econ.(DirectRolled)B14 13.55
Economy(Staybolt)B14 20.50
McK.Rks.(S.R.) L5 ...16.10
McK.Rks.(D.R.) L5 ...20.50
McK.Rks.(DirRolled)L5 13.55

BARS, Rail Steel

ChicagoHts.(3) C2, I-2 5.575
ChicagoHts.(4)(44) I-2 5.675
ChicagoHts.(4) C2 ....5.675
Franklin,Pa.(3) F5 ...5.575
Franklin,Pa.(4) F5 ...5.675
JerseyShore,Pa.(3) J8 .5.50
Marion,O.(3) P11 ....5.575
Tonawanda(3) B12 ....5.575
Tonawanda(4) B12 ....6.10

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

AlabamaCity,Ala. R2 ..5.10
Allenport,Pa. P7 .....5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky.(8) A10 ....5.10
Cleveland J5, R2 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit(8) M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Fairless,Pa. U5 .....5.15
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.20
GraniteCity,Ill.(8) G4 ...5.20
Ind.Harbor,Ind. I-2, Y1 5.10
Irvin,Pa. U5 .....5.10
Lackawanna,N.Y. B2 ..5.10
Mansfield,O. E6 .....5.10
Munhall,Pa. U5 .....5.10
Newport,Ky. A2 .....5.10
Niles,O. M21, S3 .....5.10
Pittsburg,Calif. C11 ....5.80
Pittsburgh J5 .....5.10
Portsmouth,O. P12 ....5.10
Riverdale,Ill. A1 .....5.10
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14..5.10
SparrowsPoint,Md. B2 .5.10
Steubenville,O. W10 ....5.10
Warren,O. R2 .....5.10
Weirton,W.Va. W6 ....5.10
Youngstown U5, Y1 ....5.10

SHEETS, H.R. (19 Ga. & Lighter)

Niles,O. M21, S3 .....6.275

SHEETS, H.R. Alloy

Gary,Ind. U5 .....8.40
Ind.Harbor,Ind. Y1 ....8.40
Irvin,Pa. U5 .....8.40
Munhall,Pa. U5 .....8.40
Newport,Ky. A2 .....8.40
Youngstown U5, Y1 ....8.40

SHEETS, H.R.(14 Ga. & Heavier) High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....7.525
Ashland,Ky. A10 .....7.525
Cleveland J5, R2 .....7.525
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.525
Fairless,Pa. U5 .....7.575
Farrell,Pa. S3 .....7.525
Fontana,Calif. K1 .....8.25
Gary,Ind. U5 .....7.525
Ind.Harbor,Ind. I-2, Y1 7.525
Irvin,Pa. U5 .....7.525
Lackawanna(35) B2 ..7.525
Munhall,Pa. U5 .....7.525
Niles,O. S3 .....7.525
Pittsburgh J5 .....7.525
S.Chicago,Ill. U5, W14 7.525
Sharon,Pa. S3 .....7.525
SparrowsPoint(36) B2 .7.525
Warren,O. R2 .....7.525
Weirton,W.Va. W6 ....7.525
Youngstown U5, Y1 ....7.525

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ....5.35
Cleveland R2 .....5.875
Warren,O. R2 .....5.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....7.05
Middletown,O. A10 ....6.775
Warren,O. R2 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 ..6.275
Aliquippa,Pa. J5 .....6.275
Allenport,Pa. P7 .....6.275
Cleveland J5, R2 .....6.275
Conshohocken,Pa. A3 ..6.325
Detroit M1 .....6.275
Ecorse,Mich. G5 .....6.275
Fairfield,Ala. T2 .....6.275
Fairless,Pa. U5 .....6.325
Follansbee,W.Va. F4 ..6.275
Fontana,Calif. K1 ....7.40
Gary,Ind. U5 .....6.275
GraniteCity,Ill. G4 ....6.375
Ind.Harbor,Ind. I-2, Y1 6.275
Irvin,Pa. U5 .....6.275
Lackawanna,N.Y. B2 ..6.275
Mansfield,O. E6 .....6.275
Middletown,O. A10 ....6.275
Newport,Ky. A2 .....6.275
Pittsburg,Calif. C11 ..7.225
Pittsburgh J5 .....6.275
Portsmouth,O. P12 ....6.275
SparrowsPoint,Md. B2 .6.275
Steubenville,O. W10 ....6.275
Warren,O. R2 .....6.275
Weirton,W.Va. W6 ....6.275
Yorkville,O. W10 .....6.275
Youngstown Y1 .....6.275

SHEETS, Cold-Rolled, High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....9.275
Cleveland J5, R2 .....9.275
Ecorse,Mich. G5 .....9.275
Fairless,Pa. U5 .....9.325
Fontana,Calif. K1 ....10.40
Gary,Ind. U5 .....9.275
Ind.Harbor,Ind. I-2, Y1 9.275
Lackawanna(38) B2 ..9.275
Pittsburgh J5 .....9.275
SparrowsPoint(33), B2..9.275
Warren,O. R2 .....9.275
Weirton,W.Va. W6 ....9.275
Youngstown Y1 .....9.275

SHEETS, Culvert	Cu Steel	Cu Fe
Ala.City,Ala. R2	7.125	....
Ashland,Ky. A10	7.225	7.475
Canton,O. R2	7.125	....
Fairfield,Ala. T2	7.125	7.375
Gary,Ind. U5	7.125	7.375
GraniteCity,Ill.G4	7.225	....
Ind.Harbor I-2	7.225	7.425
Irvin,Pa. U5	7.125	7.375
Kokomo,Ind. C16	7.325	....
MartinsFry. W10	7.125	7.375
Pitts.,Calif. C11	7.875	....
Pittsburgh J5	7.225	....
SparrowsPt. B2	7.225	....
Weirton W6	7.125	....

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ....7.475

SHEETS, Enameling

Ashland,Ky. A10 .....6.775
Cleveland R2 .....6.775
Fairfield,Ala. T2 .....6.775
Gary,Ind. U5 .....6.775
Ind.Harbor,Ind. I-2, Y1 6.775
Irvin,Pa. U5 .....6.775
Middletown,O. A10 ....6.775
Niles,O. M21, S3 .....6.775
SparrowsPoint,Md. B2..6.775
Youngstown Y1 .....6.775

BLUED STOCK, 29 Gage

Dover,O. E6 .....8.70
Ind.Harbor,Ind. I-2 ....8.70
Mansfield,O. E6 .....8.70
Warren,O. R2 .....8.70
Yorkville,O. W10 .....8.70

SHEETS, Long Terne, Steel

Follansbee,W.Va. W10 7.225
Gary,Ind. U5 .....7.225
Mansfield,O. E6 .....7.225
Middletown,O. A10 ....7.225
Niles,O. M21, S3 .....7.225
Warren,O. R2 .....7.225

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.625

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 9.525
Butler,Pa. A10 (type 2) 9.625
Irvin,Pa. U5 (type 1) 9.525

SHEETS, Well Casing

Fontana,Calif. K1 ....7.325
Geneva,Utah C11 .....6.80

SHEETS, Galvanized High-Strength, Low Alloy

Irvin,Pa. U5 .....10.125
Pittsburgh J5 .....10.125
SparrowsPt.(39) B2 ..10.025

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.175
Irvin,Pa. U5 .....7.175

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 ....7.125
Middletown,O. A10 ....7.125

SHEETS, Electrogalvanized

Canfield,O. C3 .....7.50
Cleveland (28) R2 ....7.65
Niles,O. (28) R2 .....7.65
Weirton,W.Va. W6 .....7.50

SHEETS, Galvanized Steel Hot-Dipped‡

AlabamaCity,Ala. R2 .6.875‡
Ashland,Ky. A10 ....6.875‡
Canton,O. R2 .....6.875‡
Dover,O. E6 .....6.875†
Fairfield,Ala. T2 ....6.875†
Gary,Ind. U5 .....6.875†
GraniteCity,Ill. G4 ..6.975*
Ind.H'rb'r,Ind. I-2, Y1 6.875†
Irvin,Pa. U5 .....6.875†
Kokomo,Ind. C16 ....6.975‡
MartinsFerry,O. W10..6.875*
Middletown,O. A10 ..6.875†
Pittsburg,Calif. C11 ..7.625*
Pittsburgh J5 .....6.875†
SparrowsPt.,Md. B2 ..6.875†
Warren,O. R2 .....6.875†
Weirton,W.Va. W6 ...6.875*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous. §For minimum spangled add 0.15c.

Key to Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A25 Algoma Steel Corp. Ltd.

B1 Babcock & Wilcox
B2 Bethlehem Steel Co.
B3 Bethlehem Steel Co., Pacific Coast Div.
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C3 Canfield Steel Co.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co., Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire Div., Hoover Ball & Bearing
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 Carpenter Steel of N.Eng.

D2 Detroit Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E2 Eastern Stainless Steel
E6 Empire-Reeves Steel
E10 Enamel Prod. & Plating

F2 Firth Sterling Inc.
F3 Fitzsimons Steel Co.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H5 Hercules Drawn Steel
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.
J10 Jay Steel Corp.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
L8 Leschen Wire Rope Div., H. K. Porter Co. Inc.

M-1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Specialty Wire Co. Inc.
M17 Metal Forming Corp.
M18 Milton Steel Div., Merritt-Chapman&Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.
M23 Mill Strip Products Co. of Pennsylvania

N1 National Standard Co.
N2 National Supply, Armco Steel Corp.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S.&W. Co.
N17 National Steel Corp.
N20 Neville Ferro Alloy Co.

O1 Ohio Ferro-Alloys Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Follak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., American Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P25 Phil. Steel & Wire Corp.

R2 Republic Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div., Eaton Mfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div. Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Div., Bliss & Laughlin Inc.
S31 Sawhill Tubular Products
S40 Seneca Steel Service
S41 Stainless & Strip Div., J & L Steel Corp.
S42 Southern Elec. Steel Co.
S43 Seymour Mfg. Co.
S44 Screw & Bolt Corp. of America
S45 Somers Brass Co.
S46 Steel Co. of Canada
S47 Seaway Steel Corp.

T2 Tenn. Coal & Iron Div. U. S. Steel Corp.
T3 Tenn. Products & Chemical
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U3 Union Wire Rope, Armco Steel Corp.
U4 Universal-Cyclops Steel
U5 U. S. Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.
U11 Union Carbide Metals Co.
U13 Union Steel Corp.

V2 Vanadium-Alloy Steel
V3 Vulcan-Kidd Steel Div., H. K. Porter Co.

W1 Wallace Barnes Steel Div., Associated Spring
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Div., National Steel Corp.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet & Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala. City, Ala. (27) R2 ...5.10
Allenport, Pa. P7 .....5.10
Alton, Ill. L1 .....5.30
Ashland, Ky. (8) A10 ....5.10
Atlanta A11 .....5.10
Bessemer, Ala. T2 .....5.10
Birmingham C15 .....5.10
Conshohocken, Pa. A3 ..5.15
Detroit M1 .....5.10
Ecorse, Mich. G5 .....5.10
Fairfield, Ala. T2 .....5.10
Farrell, Pa. S3 .....5.10
Fontana, Calif. K1 ....5.825
Gary, Ind. U5 .....5.10
Ind. Harbor, Ind. I-2, Y1.5.10
Johnstown, Pa. (25) B2 ..5.10
Lackawanna, N.Y. (25) B2.5.10
LosAngeles(25) B3 .....5.85
LosAngeles C1 .....8.60
Minnequa, Colo. C10 ....6.20
Riverdale, Ill. A1 .....5.10
SanFrancisco S7 .....6.60
Seattle(25) B3 .....6.10
Seattle N14 .....6.60
Sharon, Pa. S3 .....5.10
S. Chicago, Ill. W14 .....5.10
S. SanFrancisco(25) B3 ..5.85
SparrowsPoint, Md. B2 ..5.10
Torrance, Calif. C11 ....5.85
Warren, O. R2 .....5.10
Weirton, W.Va. W6 .....5.10
Youngstown U5, Y1 ...5.10

STRIP, Hot-Rolled Alloy

Carnegie, Pa. S18 .....8.40
Farrell, Pa. S3 .....8.40
Gary, Ind. U5 .....8.40
Houston S5 .....8.65
Ind. Harbor, Ind. Y1 ....8.40
KansasCity, Mo. S5 ....8.65
LosAngeles B3 .....9.60
Lowellville, O. S3 .....8.40
Newport, Ky. A2 .....8.40
Sharon, Pa. A2, S3 .....8.40
S. Chicago, Ill. W14 .....8.40
Youngstown U5, Y1 .....8.40

STRIP, Hot-Rolled High-Strength, Low-Alloy

Ashland, Ky. A10 .....7.575
Bessemer, Ala. T2 .....7.575
Conshohocken, Pa. A3 ...7.575
Ecorse, Mich. G5 .....7.575
Fairfield, Ala. T2 .....7.575
Farrell, Pa. S3 .....7.575
Gary, Ind. U5 .....7.575
Ind. Harbor, Ind. I-2, Y1.7.575
Lackawanna, N.Y. B2 ..7.575
LosAngeles(25) B3 ....8.325
Seattle(25) B3 .....8.575
Sharon, Pa. S3 .....7.575
S. Chicago, Ill. W14 .....7.575
S. SanFrancisco(25) B3 .8.325
SparrowsPoint, Md. B2 .7.575
Warren, O. R2 .....7.575
Weirton, W.Va. W6 .....7.575
Youngstown U5, Y1 ...7.575

STRIP, Hot-Rolled Ingot Iron

Ashland, Ky. (8) A10 ....5.35
Warren, O. R2 .....5.875

STRIP, Cold-Rolled Carbon

Anderson, Ind. G6 .....7.425
Baltimore T6 .....7.425
Boston T6 .....7.975
Buffalo S40 .....7.425
Cleveland A7 .....7.425
Dearborn, Mich. S3 ....7.425
Detroit D2, M1, P20 ..7.425
Dover, O. G6 .....7.425
Evanston, Ill. M22 .....7.425
Farrell, Pa. S3 .....7.425
Follansbee, W.Va. W10 .7.425
Fontana, Calif. K1 .....9.20
FranklinPark, Ill. T6 ..7.425
Ind. Harbor, Ind. Y1 ....7.425
Indianapolis S41 .....7.575
LosAngeles C1, S41 .....9.30
McKeesport, Pa. E10 ....7.525
NewBedford, Mass. R10..7.875
NewBritain, Conn. S15 ..7.875
NewCastle, Pa. B4, M23..7.425
NewHaven, Conn. D2 ....7.875
NewKensington, Pa. A6..7.425
Pawtucket, R.I. R3, N8..7.975
Philadelphia P24 .....7.875
Riverdale, Ill. A1 .....7.425
Rome, N.Y. (32) R6 .....7.425
Sharon, Pa. S3 .....7.425
Trenton, N.J. (31) R5 ...8.875
Warren, O. R2, T5 .....7.425
Worcester, Mass. A7 ....7.975
Youngstown Y1 .....7.425
Youngstown S41 .....7.425

STRIP, Cold-Rolled Alloy

Boston T6 .....15.90
Carnegie, Pa. S18 .....15.55
Cleveland A7 .....15.55
Dover, O. G6 .....15.55
Farrell, Pa. S3 .....15.55
FranklinPark, Ill. T6 ..15.55
Harrison, N.J. S18 .....15.55
Indianapolis S41 .....15.70
LosAngeles S41 .....17.75
Lowellville, O. S3 .....15.55
Pawtucket, R.I. S8 .....15.90
Riverdale, Ill. A1 .....15.55
Sharon, Pa. S3 .....15.55
Worcester, Mass. A7 ....15.85
Youngstown S41 .....15.55

STRIP, Cold-Rolled High Strength, Low-Alloy

Cleveland A7 .....10.80
Dearborn, Mich. S3 ....10.80
Dover, O. G6 .....10.80
Farrell, Pa. S3 .....10.80
Ind. Harbor, Ind. Y1 ....10.80
Sharon, Pa. S3 .....10.80
Warren, O. R2 .....10.80
Weirton, W.Va. W6 .....10.80
Youngstown Y1 .....10.80

STRIP, Galvanized (Continuous)

Farrell, Pa. S3 .....7.50
Sharon, Pa. S3 .....7.50

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Anderson, Ind. G6	9.10	...	...	...	...
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol, Conn. W1	....	10.70	12.90	16.10	19.30
Carnegie, Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn, Mich. S3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover, O. G6	8.95	10.40	12.60	15.60	18.55
Evanston, Ill. M22	9.05	10.40	12.60	15.60	....
Farrell, Pa. S3	8.95	10.40	12.60	15.60	18.55
Fostoria, O. S1	10.05	10.40	12.60	15.60	....
FranklinPark, Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison, N.J. C18	....	....	12.90	16.10	19.30
Indianapolis S41	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles S41	11.15	12.60	14.80	....	....
NewBritain, Conn. S15	9.40	10.70	12.90	15.90	18.85
NewCastle, Pa. B4, M23	8.95	10.40	12.60	15.60	....
NewHaven, Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington, Pa. A6	8.95	10.40	12.60	15.60	....
NewYork W3	....	10.70	12.90	16.10	19.30
Pawtucket, R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale, Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome, N.Y. R6	8.95	10.40	12.60	15.60	18.55
Sharon, Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton, N.J. R5	....	10.70	12.90	15.90	18.85
Warren, O. T5	8.95	10.40	12.60	15.60	18.55
Worcester, Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown S41	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)	Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol, Conn. W1	...	18.85	22.95	27.80
Buffalo W12	...	18.85	...	...
Fostoria, O. S1	...	19.05	22.15	...
FranklinPark, Ill. T6	...	19.20	23.30	28.15
Harrison, N.J. C18	...	18.85	22.95	27.80
NewYork W3	...	18.85	22.95	27.80
Palmer, Mass. W12	...	18.85	...	...
Trenton, N.J. R5	...	18.85	22.95	27.80
Worcester, Mass. A7, T6	...	18.85	22.95	27.80
Youngstown S41	...	19.20	23.30	28.15

STRIP, C.R., Electrogalvanized

Cleveland A7 .....7.425*
Dover, O. G6 .....7.425*
Evanston, Ill. M22 ....7.525*
McKeesport, Pa. E10 ..7.50*
NewCastle, Pa. M23 ..7.425*
Riverdale, Ill. A1 .....7.525*
Warren, O. B9, S3, T5..7.425*
Worcester, Mass. A7 ...7.975
Youngstown S41 .....7.425*

*Plus galvanizing extras.

STRIP, Cold-Rolled Ingot Iron

Warren, O. R2 .....8.175

TIGHT COOPERAGE HOOP

Atlanta A11 .....5.825
Farrell, Pa. S3 .....5.525
Riverdale, Ill. A1 .....5.675
Sharon, Pa. S3 .....5.525
Youngstown U5 .....5.525

TIN MILL PRODUCTS

ELECTROLYTIC THIN TIN PLATE (¼ lb coating in coils)

	Basis Weight 45 lb	50 lb	55 lb	60 lb
Fairfield, Ala. T2	$6.10	$6.25	$6.40	$6.55
Fairless, Pa. U5	6.10	6.25	6.40	6.55
Gary, Ind. U5	6.10	6.25	6.40	6.55
IndianaHarbor, Ind. I-2	6.10	6.25	6.40	6.55
Irvin, Pa. U5	6.10	6.25	6.40	6.55
SparrowsPoint, Md. B2	6.10	6.25	6.40	6.55
Weirton, W.Va. W6	6.10	6.25	6.40	6.55

TIN PLATE, Electrolytic (100 lb basis wt)	0.25 lb Coating
Aliquippa, Pa. J5	$9.10
Fairfield, Ala. T2	9.10
Fairless, Pa. U5	9.10
Fontana, Calif. K1	9.75
Gary, Ind. U5	9.10
GraniteCity, Ill. G4	9.20
Ind. Harb., Ind. I-2, Y1	9.10
Irvin, Pa. U5	9.10
Niles, O. R2	9.10
Pittsburg, Calif. C11	9.75
SparrowsPt., Md. B2	9.10
Weirton, W.Va. W6	9.10
Yorkville, O. W10	9.10

ELECTRO. TIN-COATED SHEET (20-27 gage; per 100 lb)

IndianaHarb., Ind. Y1 ..$7.90

(21-27 gage; per 100 lb)

Aliquippa, Pa. J5 .....$7.90
Niles, O. R2 .....7.90

TIN PLATE, HOT DIPPED COMMON COKE	1.25 lb	1.50 lb
Aliquippa, Pa. J5	$10.40	$10.65
Fairfield, Ala. T2	10.40	10.65
Fairless, Pa. U5	10.40	10.65
Fontana, Calif. K1	11.05	11.30
Gary, Ind. U5	10.40	10.65
Irvin, Pa. U5	10.40	10.65
Pitts., Calif. C11	11.05	11.30
Sp. Pt., Md. B2	10.40	10.65
Weirton, W.Va. W6	10.40	10.65
Yorkville, O. W10	10.40	10.65

BLACK PLATE (Base Box)

Aliquippa, Pa. J5 .....$8.20
Fairfield, Ala. T2 .....8.20
Fairless, Pa. U5 .....8.20
Fontana, Calif. K1 .....8.85
Gary, Ind. U5 .....8.20
GraniteCity, Ill. G4 .....8.30
Ind. Harbor, Ind. I-2, Y1.8.20
Irvin, Pa. U5 .....8.20
Niles O. R2 .....8.20
Pittsburg, Calif. C11 ....8.85
SparrowsPoint, Md. B2 ..8.20
Weirton, W.Va. W6 .....8.20
Yorkville, O. W10 .....8.20

HOLLOWARE ENAMELING (Black plate) (29 Gage)

Aliquippa, Pa. J5 .....7.85
Gary, Ind. U5 .....7.85
GraniteCity, Ill. G4 ....7.95
Ind. Harbor, Ind. Y1 ....7.85
Irvin, Pa. U5 .....7.85
Yorkville, O. W10 .....7.85

SILICON STEEL

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom, W.Va. W10	....	11.70	12.40	13.35	14.65
Brackenridge, Pa. A4	....	....	12.40	13.55	14.65
GraniteCity, Ill. G4	9.975*	11.30*	12.00*	13.15*	....
IndianaHarbor, Ind. I-2	9.875*	11.20*	11.90*	13.05*	....
Mansfield, O. E6	9.875*	11.70	12.40	13.55	14.65
Newport, Ky. A2	9.875	11.70*	12.40*	13.55*	14.65*
Niles, O. M21	9.875*	11.70	12.40	13.55	....
Vandergrift, Pa. U5	9.875*	11.70	12.40	13.55	14.65
Warren, O. R2	9.875*	11.70	12.40	13.55	14.65
Zanesville, O. A10	....	11.70†	12.40	13.55	14.65

	Stator
Mansfield, O. E6	8.10
Vandergrift, Pa. U5	8.10
Warren, O. R2 (Locore)	8.10

SHEETS (22 Ga., coils & cut lengths)

Fully Processed (Semiprocessed ½c lower)	T-72	T-65	T-58	T-52
BeechBottom, W.Va. W10	....	15.70	16.30	16.80	17.85
Vandergrift, Pa. U5	.....	15.70	16.30	16.80	17.85
Zanesville, O. A10	.....	15.70	16.30	16.80	17.85

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge, Pa. A4	....	18.10	19.70	20.20	20.70	15.70††
Butler, Pa. A10	....	....	....	19.70	20.20	20.70	....
Vandergrift, Pa. U5	..	17.10	18.10	19.70	20.20	20.70	15.70
Warren, O. R2	.....	....	....	....	....	....	15.70†

*Semiprocessed. †Fully processed only. §Coil annealed; semiprocessed ½c lower. ††Coils only.

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity, Ala. R2 ...8.00
Aliquippa, Pa. J5 .....8.00
Alton, Ill. L1 .....8.20
Atlanta A1 .....8.00
Bartonville, Ill. K4 .....8.10
Buffalo W12 .....8.00
Chicago W13 .....8.00
Cleveland A7, C20 .....8.00
Crawfordsville, Ind. M8..8.10
Donora, Pa. A7 .....8.00
Duluth A7 .....8.00
Fairfield, Ala. T2 .....8.00
Fostoria, O. (24) S1 .....8.10
Houston S5 .....8.25
Jacksonville, Fla. M8 ...8.35
Johnstown, Pa. B2 .....8.00
Joliet, Ill. A7 .....8.00
KansasCity, Mo. S5 .....8.25
Kokomo, Ind. C16 .....8.10
LosAngeles B3 .....8.95
Minnequa, Colo. C10 ....8.25
Monessen, Pa. P7, P16 ..8.00
N. Tonawanda S47 .....8.00
Palmer, Mass. W12 .....8.30
Pittsburg, Calif. C11 ...8.95
Portsmouth, O. P12 .....8.00
S. Chicago, Ill. R2 .....8.00
S. SanFrancisco C10 ....8.95
SparrowsPoint, Md. B2 ..8.10
Sterling, Ill. (1) N15 ....8.00
Sterling, Ill. N15 .....8.10
Struthers, O. Y1 .....8.00
Waukegan, Ill. A7 .....8.00
Worcester, Mass. A7 ....8.30

WIRE, Cold Heading Carbon

Elyria, O. W8 .....8.00
N. Tonawanda S47 .....8.00

WIRE, Gal'd., for ACSR

Bartonville, Ill. K4 ....12.65
Buffalo W12 .....13.40
Cleveland A7 .....12.65
Donora, Pa. A7 .....12.65
Duluth A7 .....12.65
Johnstown, Pa. (10) B2 .12.65
KansasCity, Mo. U3 ....12.90
LosAngeles(2) B3 .....13.60
Minnequa, Colo. C10 ...12.775
Monessen, Pa. P7, P16..12.65
Muncie, Ind. I-7 .....13.60
NewHaven, Conn. A7 ....12.95
Palmer, Mass. W12 .....13.70
Pittsburg, Calif. C11 ...13.45
Portsmouth, O. P12 ....12.65
Roebling, N.J. R5 .....12.95
SparrowsPt., Md. (10) B2 12.75
Struthers, O. Y1 .....13.40
Trenton, N.J. A7 .....12.95
Waukegan, Ill. A7 .....12.65
Worcester, Mass. A7 ....12.95

WIRE, Upholstery Spring

Aliquippa, Pa. J5 .....9.75
Alton, Ill. L1 .....9.95
Buffalo W12 .....9.75
Cleveland A7 .....9.75
Donora, Pa. A7 .....9.75
Duluth A7 .....9.75
Johnstown, Pa. B2 .....9.75
KansasCity, Mo. S5, U3..10.00
Kokomo, Ind. C16 .....9.85
LosAngeles B3 .....10.70
Minnequa, Colo. C10 ....9.95
Monessen, Pa. P7, P16 ..9.75
NewHaven, Conn. A7 ..10.95
Palmer, Mass. W12 ....10.05
Pittsburg, Calif. C11 ..10.075
Portsmouth, O. P12 ....9.75
Roebling, N.J. R5 .....10.05
S. Chicago, Ill. R2 .....9.75
S. SanFrancisco C10 ..10.075
SparrowsPt., Md. B2 ....9.85
Struthers, O. Y1 .....9.75
Trenton, N.J. A7 .....10.05
Worcester, Mass. A7 ....10.05

WIRE, MB Spring, High-Carbon

Aliquippa, Pa. J5 .....9.75
Alton, Ill. L1 .....9.95
Bartonville, Ill. K4 .....9.85
Buffalo W12 .....9.75
Cleveland A7 .....9.75
Donora, Pa. A7 .....9.75
Duluth A7 .....9.75
Fostoria, O. S1 .....9.80
Johnstown, Pa. B2 .....9.75
KansasCity, Mo. S5, U3..10.00
LosAngeles B3 .....10.20
Milbury, Mass. (12) N6 ..10.05
Minnequa, Colo. C10 ....9.95
Monessen, Pa. P7, P16 ..9.75
Muncie, Ind. I-7 .....9.95
Palmer, Mass. W12 ....10.05
Pittsburg, Calif. C11 ...10.20
Portsmouth, O. P12 ....9.75
Roebling, N.J. R5 .....10.05
S. Chicago, Ill. R2 .....9.75
S. SanFrancisco C10 ....10.20
SparrowsPt., Md. B2 ....9.85
Struthers, O. Y1 .....9.75
Trenton, N.J. A7 .....10.05
Waukegan, Ill. A7 .....9.75
Wor'ster, Mass. A7, J4, T6 10.05

WIRE, Fine & Weaving (8" Coils)

Alton, Ill. L1 .....16.50
Bartonville, Ill. K4 ....16.40
Chicago W13 .....16.30
Cleveland A7 .....16.30
Crawfordsville, Ill. M8..16.30
Fostoria, O. S1 .....16.30
Houston S5 .....16.55
Jacksonville, Fla. M8 ...16.65
Johnstown, Pa. B2 .....16.30
KansasCity, Mo. S5 .....16.55
Kokomo, Ind. C16 .....16.30
Minnequa, Colo. C16 ....16.55
Monessen, Pa. P16 .....16.30
Muncie, Ind. I-7 .....16.50
Palmer, Mass. W12 .....16.60
S. SanFrancisco C10 ....17.15
Waukegan, Ill. A7 .....16.30
Worcester, Mass. A7, J6 .16.60

ROPE WIRE (A)

Bartonville, Ill. K4 ....13.45
Buffalo W12 .....13.45
Fostoria, O. S41 .....13.45
Johnstown, Pa. B2 .....13.45
Monessen, Pa. P7 .....13.45
Muncie, Ind. I-7 .....13.65
Palmer, Mass. W12 .....13.75
Portsmouth, O. P12 ....13.45
Roebling, N.J. R5 .....13.75
St. Louis L8 .....13.45
SparrowsPt., Md. B2 ....13.55
Struthers, O. Y1 .....13.45
Worcester, Mass. J4 ....13.75

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE, Tire Bead

Bartonville,Ill. K4	17.15
Monessen,Pa. P16	17.15
Roebling,N.J. R5	17.65

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	12.35
Baltimore T6	12.65
Boston T6	12.65
Buffalo W12	12.35
Chicago W13	12.45
Cleveland A7	12.35
Crawfordsville,Ind. M8	12.35
Dover,O. G6	12.35
Evanston,Ill. M22	12.45
Farrell,Pa. S3	12.35
Fostoria,O. S1	12.35
FranklinPark,Ill. T6	12.45
Kokomo,Ind. C16	12.35
Massillon,O. R8	12.35
Milwaukee C23	12.55
Monessen,Pa. P7, P16	12.35
NewCastle,Pa. M23	12.35
Palmer,Mass. W12	12.65
Pawtucket,R.I. N8	12.65
Philadelphia P24	12.65
Riverdale,Ill. A1	12.45
Rome,N.Y. R6	12.35
Sharon,Pa. S3	12.35
Trenton,N.J. R5	12.65
Warren,O. B9	12.35
Worcester,Mass. A7, T6	12.65

NAILS, Stock Sizes	Col.
AlabamaCity,Ala. R2	173
Aliquippa,Pa. J5	173
Atlanta A11	173
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla. M8	175
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	178
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling, Ill.(7) N15	175
Worcester,Mass. A7	179

(To Wholesalers: per cwt)

Galveston,Tex. D7 ... $10.30

NAILS, Cut (100 lb kegs)

Wheeling,W.Va. W10 .. $10.10

POLISHED STAPLES	Col.
AlabamaCity,Ala. R2	175
Aliquippa,Pa. J5	173
Atlanta A11	173
Bartonville,Ill. K4	175
Crawfordsville,Ind. M8	177
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	180
Jacksonville,Fla. M8	177
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	180
Kokomo,Ind. C16	177
Minnequa,Colo. C10	178
Pittsburg,Calif. C11	194
Rankin,Pa. A7	173
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

TIE WIRE, Automatic Baler (14½ Ga.) (per 97 lb net box) Coil No. 3150

AlabamaCity,Ala. R2	$8.78
Atlanta A11	10.36
Bartonville,Ill. K4	8.88
Buffalo W12	10.26
Chicago W13	9.24
Crawfordsville,Ind. M8	8.88
Donora,Pa. A7	8.78
Duluth A7	8.78
Fairfield,Ala. T2	8.78
Houston S5	9.02
Jacksonville,Fla. M8	8.88
Johnstown,Pa. B2	8.78
Joliet,Ill. A7	8.78
KansasCity,Mo. S5	9.02
Kokomo,Ind. C16	8.88
LosAngeles B3	9.20
Minnequa,Colo. C10	8.02
Pittsburg,Calif. C11	9.20
S.Chicago,Ill. R2	8.78
S.SanFrancisco C10	9.20
SparrowsPt.,Md. B2	8.88
Sterling,Ill.(37) N15	8.88

Coil No. 6500 Stand. 100 lb coil

AlabamaCity,Ala. R2	$9.06
Atlanta A11	10.70
Bartonville,Ill. K4	9.16
Buffalo W12	10.60
Chicago W13	9.54
Crawfordsville,Ind. M8	9.16
Donora,Pa. A7	9.06
Duluth A7	9.06
Fairfield,Ala. T2	9.06
Houston S5	9.30
Jacksonville,Fla. M8	9.16
Johnstown,Pa. B2	9.06
Joliet,Ill. A7	9.06
KansasCity,Mo. S5	9.30
Kokomo,Ind. C16	9.16
LosAngeles B3	9.50
Minnequa,Colo. C10	9.30
Pittsburg,Calif. C11	9.50
S.Chicago,Ill. R2	9.06
S.SanFrancisco C10	9.50
SparrowsPt.,Md. B2	9.16
Sterling,Ill.(37) N15	9.16

Coil No. 6500 Interim 100 lb coil

AlabamaCity,Ala. R2	$9.11
Atlanta A11	10.75
Bartonville,Ill. K4	9.21
Buffalo W12	10.65
Chicago W13	9.59
Crawfordsville,Ind. M8	9.21
Donora,Pa. A7	9.11
Duluth A7	9.11
Fairfield,Ala. T2	9.11
Houston S5	9.35
Jacksonville,Fla. M8	9.21
Johnstown,Pa. B2	9.11
Joliet,Ill. A7	9.11
KansasCity,Mo. S5	9.35
Kokomo,Ind. C16	9.21
LosAngeles B3	9.55
Minnequa,Colo. C10	9.35
Pittsburg,Calif. C11	9.55
S.Chicago,Ill. R2	9.11
S.SanFrancisco C10	9.55
SparrowsPt.,Md. B2	9.21
Sterling,Ill.(37) N15	9.21

BALE TIES, Single Loop	Col.
AlabamaCity,Ala. R2	212
Atlanta A11	212
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	214
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
SparrowsPt.,Md. B2	214
Sterling,Ill.(7) N15	214

WIRE, Barbed	Col.
AlabamaCity,Ala. R2	193**
Aliquippa,Pa. J5	190‡
Atlanta A11	197*
Bartonville,Ill. K4	199
Crawfordsville,Ind. M8	198
Donora,Pa. A7	193†
Duluth A7	193†
Fairfield,Ala. T2	193†
Houston S5	198**
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	196‡
Joliet,Ill. A7	193†
KansasCity,Mo. S5	198**
Kokomo,Ind. C16	195†
Minnequa,Colo. C10	198**
Monessen,Pa. P7	196‡
Pittsburg,Calif. C11	213†
Rankin,Pa. A7	193†
S.Chicago,Ill. R2	193**
SparrowsPoint,Md. B2	195‡
Sterling,Ill.(7) N15	198

WIRE (16 gage)	An'ld Stone	Galv. Stone
Ala.City,Ala.R2	17.85	19.40**
Aliq'ppa,Pa. J5	17.85	19.65
Bartonville K4	17.95	19.80
Chicago W13	17.85	....
Cleveland A7	17.85	....
Craw'sville M8	17.95	19.80‡‡
Fostoria,O. S1	18.35	19.90†
Houston S5	18.10	19.65**
Jacksonville M8	17.95	19.80‡‡
Johnstown B2	17.85	19.65‡‡
Kan.City,Mo. S5	18.10	....
Kokomo C16	17.95	19.50†
Minnequa C10	18.10	19.65**
P'lm'r,Mass.W12	19.10	19.70†
Pitts.,Calif. C11	18.20	19.75†
S.SanFran. C10	18.20	19.75**
SparrowsPt. B2	17.95	19.75‡
St'ling(37) N15	17.95	19.80
Waukegan A7	17.85	19.40†
Worcester A7	18.15	....

FENCE POSTS	Col.
Birmingham C15	177
ChicagoHts.,Ill. C2, I-2	177
Duluth A7	177
Franklin,Pa. F5	177
Johnstown,Pa. B2	177
Marion,O. P11	177
Minnequa,Colo. C10	182
Tonawanda,N.Y. B12	177

WOVEN FENCE, 9-15 Ga.	Col.
Ala.City,Ala. R2	187**
Aliq'ppa,Pa.9-11½Ga.J5	190‡
Atlanta A11	191*
Bartonville,Ill. K4	193
Crawfordsville,Ind. M8	192
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston S5	192**
Jacksonville,Fla. M8	192
Johnstown,Pa.(42) B2	190‡
Joliet,Ill. A7	187†
KansasCity,Mo. S5	192**
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192**
Pittsburg,Calif. C11	210†
Rankin,Pa. A1	187†
S.Chicago,Ill. R2	187**
Sterling,Ill.(7) N15	192

WIRE, Merchant Quality 6 to 8 gage	An'ld	Galv.
Ala.City,Ala. R2	9.00	9.55**
Aliquippa J5	8.65	9.325‡
Atlanta(48) A11	9.00	9.75*
Bartonville(48) K4	9.85	9.90
Buffalo W12	9.00	9.55†
Chicago W13	9.00	9.55**
Cleveland A7	9.00	....
CrawfordsvilleM8	9.10	9.80††
Donora,Pa. A7	9.00	9.55†
Duluth A7	9.00	9.55†
Fairfield T2	9.00	9.55
Houston(48) S5	9.25	9.80**
Jack'vill,Fla. M8	9.10	9.80‡‡
Johnstown(48) B2	9.00	9.675‡
Joliet,Ill. A7	9.00	9.55†
KansasCity(48)S5	9.25	9.80**
Kokomo(48) S16	9.10	9.65†
LosAngeles B3	9.95	10.625‡
Minnequa C10	9.25	9.80**
Monessen(48) P7	8.65	9.35‡
Palmer,Mass. W12	9.30	9.85†
Pitts.,Calif. C11	9.95	10.50†
Rankin,Pa. A7	9.00	9.55†
S.Chicago R2	9.00	9.55**
S.SanFran. C10	9.95	10.50**
Spar'wsPt.(48)B2	9.10	9.775‡
St'ling(37)(48)N15	9.10	9.80
Struthers,O. Y1	9.00	9.65‡
Worcester,Mass.A7	9.30	9.85†

Based on zinc prices of: *13.50c. †5c. §10c. ‡Less than 10c. ††10.50c. ‡‡11.10c. **Subject to zinc equalization extras.

FASTENERS

SCREWS, NUTS, BOLTS

(Consumer discounts per cent off list prices, plain finishes. For less than full container quantities, add 25 per cent; attaching nuts to bolts in sizes ¼ in. through ⅝ in. diameter through 8 in. in length, price on application. Discounts are determined by the quantity of screws, nuts, and bolts ordered for one destination at one time.)

Base, one keg	43.00
20,000 lb or more	53.00

SCREWS, SETSCREWS

Hex Screws and High Strength Hex Screws, through 1 in. x 12 in.:

Base, one keg	43.00
20,000 lb or more	53.00

Hex Screws 1⅛ in. diameter and larger: See net price schedule.

Fillister Head Screws, coarse thread:

Packages	+70.00
Bulk	+28.00

Flat Head Screws, coarse thread:

Packages	+100.00
Bulk	+52.00

Setscrews, Square Head, Cup-point, coarse thread:

Packages	+10.00
Bulk	15.00

(Bulk discounts on fillister, flat head, and set screws apply only to products ordered in these minimum quantities: ¼ in. through ⅝ in. diameter, 15,000 pieces; ¾ in. through ⅞ in. diameter, 5000 pieces; and ⅞ in. through 1 in. diameter, 2000 pieces.)

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.

Structural ½ in. larger 12.85 7/16 in. and smaller by 6 in. and shorter: 15% off list.

PRESTRESSED STRAND

(High strength, stress relieved; 7 wire uncoated. Net prices per 1000 ft, 40,000 lb and over.)

	Standard Diameter, Inches 1/4	5/16	3/8	7/16	1/2
Buffalo W12	$26.20	$38.50	$47.90	$61.30	$80.30
KansasCity,Mo. U3	26.20	38.50	47.90	61.30	80.30
Minnequa,Colo. C10	26.20	38.50	47.90	61.30	80.30
Pittsburg,Calif. C11	26.20	38.50	47.90	61.30	80.30
Roebling,N.J. R5	26.20	38.50	47.90	61.30	80.30
SparrowsPoint,Md. B2	26.20	38.50	47.90	61.30	80.30
St. Louis L8	26.20	38.50	47.90	61.30	80.30
Waukegan,Ill. A7	26.20	38.50	47.90	61.30	80.30

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut length 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	27.24	23.12
1¼	13	....	32.25	24.41
1½	13	30.42	35.65	26.98
1¾	13	35.94	42.12	31.89
2	13	40.28	47.21	35.74
2¼	13	45.36	58.17	40.26
2½	12	49.24	57.72	43.70
2½	12	54.23	63.57	48.13
2¾	12	58.73	68.83	52.13
3	12	62.62	73.40	55.59

RAILWAY MATERIALS

Rails	Standard No. 1	Standard No. 2	Standard All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	5.75	5.65	....	6.725
Ensley,Ala. T2	5.75	5.65	....	6.725
Fairfield,Ala. T2	....	....	....	6.725
Gary,Ind. U5	5.75	5.65	....	....
Huntington,W.Va. C15	....	....	....	6.725
Johnstown,Pa. B2	....	....	....	(16)6.725
Lackawanna,N.Y. B2	5.75	5.65	....	6.725
Minnequa,Colo. C10	5.75	5.65	....	7.225
Steelton,Pa. B2	5.75	5.65	....	....

TIE PLATES	
Fairfield,Ala. T2	6.875
Gary,Ind. U5	6.875
Lackawanna,N.Y. B2	6.875
Minnequa,Colo. C10	6.875
Seattle B3	7.025
Steelton,Pa. B2	6.875
Torrance,Calif. C11	7.025

JOINT BARS	
Bessemer,Pa. U5	7.25
Fairfield,Ala. T2	7.25
Joliet,Ill. U5	7.25
Lackawanna,N.Y. B2	7.25
Minnequa,Colo. C10	7.25
Steelton,Pa. B2	7.25

AXLES	
Ind.Harbor,Ind. S13	9.125
Johnstown,Pa. B2	9.125

SCREW SPIKES	
Lebanon,Pa. B2	15.10

TRACK BOLTS, Untreated	
Cleveland R2	15.35
KansasCity,Mo. S5	15.35
Lebanon,Pa. B2	15.35
Minnequa,Colo. C10	15.35
Pittsburgh S44	15.35
Seattle B3	15.85

STANDARD TRACK SPIKES	
Fairfield,Ala. T2	10.10
Ind.Harbor,Ind. I-2, Y1	10.10
KansasCity,Mo. S5	10.10
Lebanon,Pa. B2	10.10
Minnequa,Colo. C10	10.10
Pittsburgh J5	10.10
Seattle B3	10.60
S.Chicago,Ill. R2	10.10
Struthers,O. Y1	10.10
Youngstown R2	10.10

FOOTNOTES

(1) Chicago base.
(2) Double galvanized.
(3) Merchant.
(4) Reinforcing.
(5) 1½ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in., 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(6) Limited analyses only.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Bethany A coating.
(12) Worcester, Mass., base.
(15) ⅝" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(27) Bar mill sizes.
(28) Bonderized.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.375c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) 14 Ga., 48 in.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 13 Ga. & lighter; 60" & narrower.
(39) 48" and narrower.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds and 2½ in. and smaller hexagons; 9.625c for larger rounds and hexagons and other shapes.

Photo courtesy Jones & Laughlin Steel Corp., Pittsburgh

FOR EVERY APPLICATION, THERE'S ONE CRANE OUTSTANDING . . . P&H!

This wide-span P&H overhead crane is equipped with a trolley-mounted cab so the *operator stays right above the load at all times.* He can clearly see to move and load coils of steel or stacks of plate with unquestioned safety and accuracy. In addition, the P&H Hook-a-Weigh electronic crane scale, in combination with a motorized hook, enables the crane operator to both weigh loads and rotate them safely and precisely. This means faster shipping and easier spotting.

Here, as in every P&H crane installation, Harnischfeger engineers have carefully considered all the factors that affect performance. P&H cranes are built from standard components —yet are individually engineered for the job. Your particular material-handling requirements are integrated right into the overall design. Result: Costs are kept low—but performance is unbeatable.

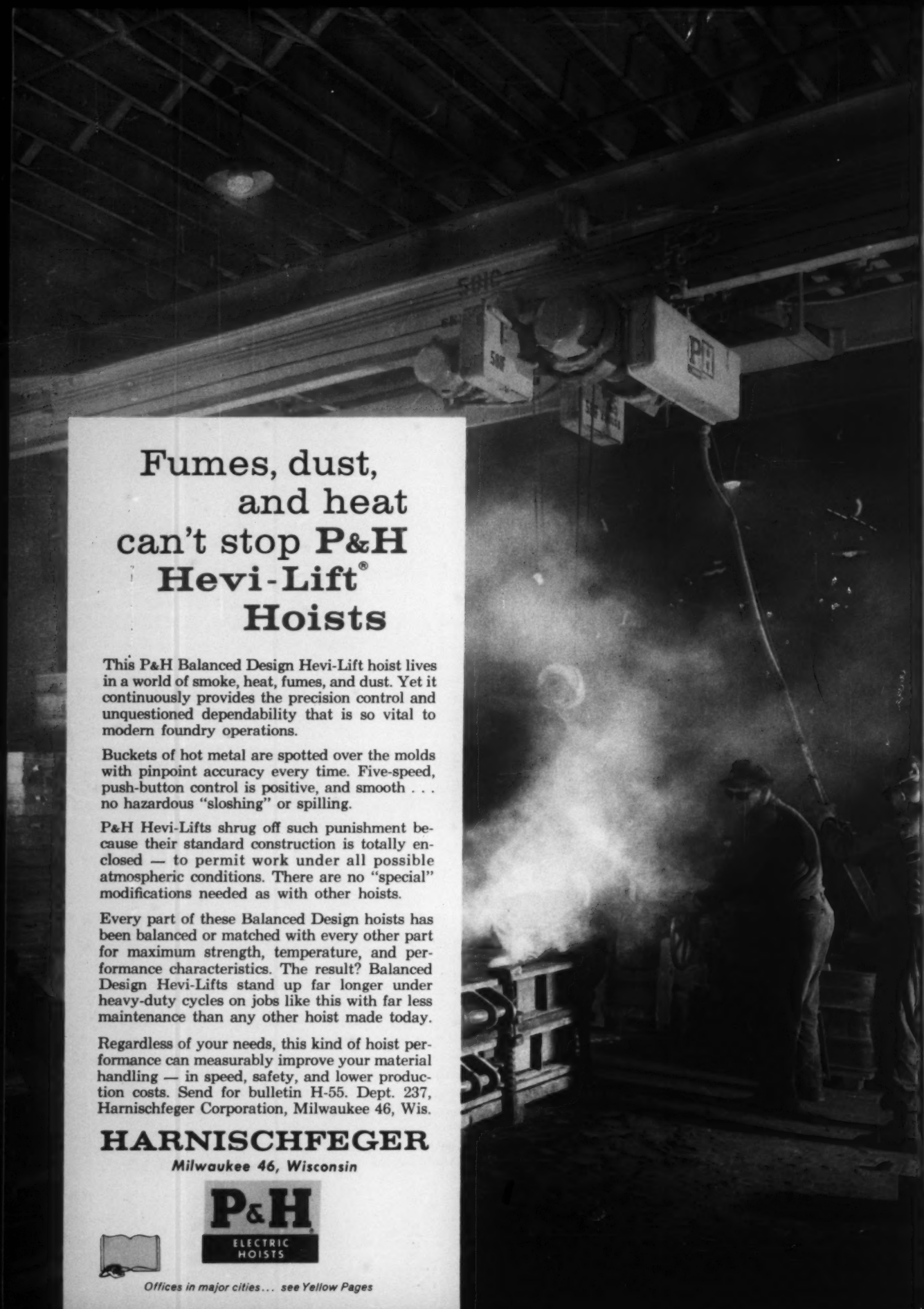
Whether you need 3-ton or 300-ton capacity, it will pay you to find out more about P&H job-engineered overhead cranes . . . and what they can mean to your plant operation. Get a helpful recommendation on your next crane inquiry — send it to Harnischfeger!

P&H Hook-a-Weigh transforms the crane hook into a sensitive, accurate electronic scale. It easily combines weighing and handling operations — eliminates floor-mounted scale equipment. It also maintains an accurate, permanent record on tape or card. Can be used on any crane — capacities up to 200,000 lbs. Another useful feature, the motorized hook, can be combined with Hook-a-Weigh or offered separately, to enable the crane operator to rotate the load at the push of a button, eliminating in many cases, the need for floor help.

Offices in major cities... see Yellow Pages

HARNISCHFEGER
Milwaukee 46, Wisconsin

P&H
OVERHEAD CRANES



Fumes, dust, and heat can't stop P&H Hevi-Lift® Hoists

This P&H Balanced Design Hevi-Lift hoist lives in a world of smoke, heat, fumes, and dust. Yet it continuously provides the precision control and unquestioned dependability that is so vital to modern foundry operations.

Buckets of hot metal are spotted over the molds with pinpoint accuracy every time. Five-speed, push-button control is positive, and smooth . . . no hazardous "sloshing" or spilling.

P&H Hevi-Lifts shrug off such punishment because their standard construction is totally enclosed — to permit work under all possible atmospheric conditions. There are no "special" modifications needed as with other hoists.

Every part of these Balanced Design hoists has been balanced or matched with every other part for maximum strength, temperature, and performance characteristics. The result? Balanced Design Hevi-Lifts stand up far longer under heavy-duty cycles on jobs like this with far less maintenance than any other hoist made today.

Regardless of your needs, this kind of hoist performance can measurably improve your material handling — in speed, safety, and lower production costs. Send for bulletin H-55. Dept. 237, Harnischfeger Corporation, Milwaukee 46, Wis.

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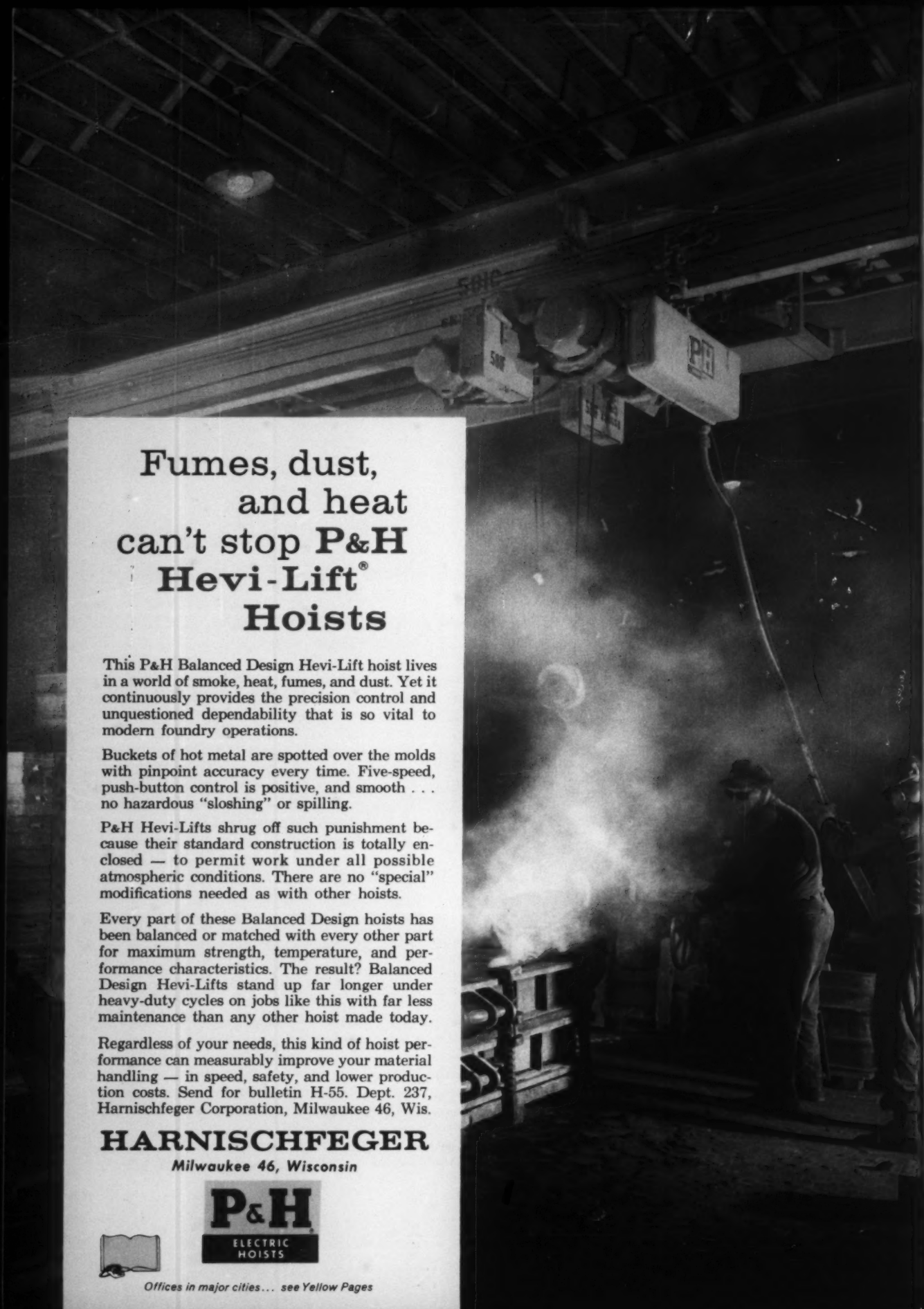
ELECTRIC HOISTS

Offices in major cities... see Yellow Pages



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P&H

ELECTRIC HOISTS

Offices in major cities... see Yellow Pages

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+12.25	+27.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Ambridge, Pa. N2	+12.25	....	+5.75	....	+3.25	....	+1.75	....	+1.75	....	+2	....	0.5	....
Lorain, O. N3	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Youngstown Y1	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

ELECTRICWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Alton, Ill. L1	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Benwood, W. Va. W10	1.5	+27	+10.5	+36	+21	+45.5	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Butler, Pa. F6	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+28	+7.75	+24	+4.25	+19.5	+1.75	+18.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+16	4.25	+12	7.75	+7.5	10.25	+6.25
Lorain, O. N3	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sharon, Pa. S4	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sparrows Pt., Md. B2	2.5	+26	+10.5	+36	+21.5	+46	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Wheatland, Pa. W9	4.5	+24	+8.5	+34	+19.5	+44	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.75		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Alton, Ill. L1	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Benwood, W. Va. W10	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Etna, Pa. N2	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Fairless, Pa. N3	9.75	+6.25	10.25	+5.25	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Fontana, Calif. K1	+1.25	+17.25	+0.75	+16.75	0.75	+16.5	0.75	+16.5	+9.75	+27.5	+9.75	+27.5
Indiana Harbor, Ind. Y1	10.75	+5.25	11.25	+4.75	12.75	+4.5	12.75	+4.5	2.25	+15.5	2.25	+15.5
Lorain, O. N3	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sharon, Pa. M6	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Sparrows Pt., Md. B2	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Wheatland, Pa. W9	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Youngstown R2, Y1	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5

*Galvanized pipe discounts based on price of zinc at 11.50c, East St. Louis.

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	Rerolling Ingot	Rerolling Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.75	25.00	....	36.00	....	43.50	39.25	48.50	43.50
202	24.75	28.25	37.75	39.00	42.25	44.50	40.00	49.25	46.75
301	24.00	26.00	38.75	37.25	43.50	46.00	41.25	51.25	45.00
302	26.25	29.50	39.50	40.50	44.25	46.75	42.25	52.00	49.50
302B	26.50	30.75	42.25	45.75	46.75	49.00	44.50	57.00	57.00
303	....	33.25	42.50	....	47.25	49.75	45.00	56.75	56.75
304	28.00	29.50	39.50	40.50	44.25	46.75	45.75	52.00	49.50
304L	....	37.25	47.25	48.25	52.00	54.50	53.50	59.75	57.25
305	29.50	34.75	44.00	47.50	47.00	49.50	46.25	58.75	58.75
308	32.00	36.25	49.00	50.25	54.75	57.75	55.25	63.00	63.00
309	41.25	47.50	60.00	64.50	66.25	69.50	66.00	80.50	80.50
310	51.50	59.50	81.00	84.25	89.75	94.50	87.75	96.75	96.75
314	....	....	80.50	....	89.75	94.50	87.75	....	104.25
316	41.25	47.50	64.50	68.50	71.75	75.75	71.75	80.75	76.75
316L	....	55.25	72.25	76.25	79.50	83.50	79.50	88.50	84.50
317	49.75	58.00	79.75	88.25	89.50	94.25	88.50	101.00	101.00
321	33.50	38.00	48.75	53.50	54.50	57.50	54.75	65.50	62.25
380	....	....	123.25	....	98.75	143.75	135.00	149.25	149.25
18-8 Cb-Ta	38.50	48.25	57.75	63.50	63.75	67.25	64.75	79.25	75.25
403	....	....	26.75	....	29.75	31.50	30.00	40.25	40.25
405	20.25	26.50	30.75	36.00	34.75	36.50	32.50	46.75	46.75
410	17.50	19.50	26.75	31.00	29.75	31.50	30.00	40.25	40.25
416	....	....	29.75	....	33.75	35.50	31.25	48.25	48.25
420	....	31.50	35.50	41.75	40.75	42.75	40.25	62.00	62.00
430	17.75	19.75	29.75	32.00	33.75	35.50	31.00	40.75	38.75
430F	....	....	30.50	....	34.25	36.00	31.75	51.75	42.00
431	....	29.75	39.25	....	43.50	46.00	41.00	56.00	56.00
446	....	....	40.75	59.00	46.00	48.25	42.75	70.00	70.00

Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; Calstrip Steel Corp.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Elwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Phoenix Steel Corp.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Somers Brass Co.; Specialty Wire Co. Inc.; Standard Tube Co.; Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steels, Inc.; Union Steel Corp.; U. S. Steel Corp.; Universal Cyclops Corp.; Vanadium-Alloy Steel Co., Wall Tube & Metal Products Co.; Wallingford Steel, subsidiary of Allegheny Ludlum Steel Corp.; Washington Steel Corp.; Seymour Mfg. Co.

Clad Steel

	Plates: 5%	Plates: Carbon Base 10%	Plates: Carbon Base 15%	Plates: Carbon Base 20%	Sheets: Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	26.05	28.80	31.55	34.30	39.75
304L	30.50	33.75	36.95	40.15	....
316	38.20	42.20	46.25	50.25	58.25
316L	42.30	46.75	51.20	55.65	....
316 Cb	49.90	55.15	60.40	65.65	....
321	31.20	34.50	37.75	41.05	47.25
347	36.90	40.80	44.65	48.55	57.00
405	22.25	24.60	26.90	29.25	....
410	20.55	22.70	24.85	27.00	....
430	21.20	23.45	25.65	27.90	....
Inconel	49.80	61.35	72.80	84.40	....
Nickel	43.20	55.05	66.95	78.90	....
Nickel, Low Carbon	43.50	55.70	67.95	80.35	....
Monel	44.25	55.35	66.45	77.60	....

	Strip, Carbon Base —Cold Rolled— 10%	Strip, Carbon Base —Cold Rolled— Both Sides
Copper*	36.10	43.00

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. P4; Coatesville, Pa. L7; New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Claymont, Del. P4; Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	Hi-Carbon-Cr (D-11)	0.955
Spec. Carbon (W-1)	0.385	V-Cr Hot Work (H-13)	0.550
Oil Hardening (O-1)	0.505	W-Cr Hot Work (H-12)	0.530
V-Cr Hot Work (H-11)	0.505	W Hot Wk (H-21)	1.425-1.44

Grade by Analysis (%) W	Cr	V	Co	Mo	AISI Designation	$ per lb
18	4	1	....	....	T-1	1.840
18	4	2	....	....	T-2	2.005
13.5	4	3	....	....	T-3	2.105
18.25	4.25	1	4.75	....	T-4	2.545
18	4	2	9	....	T-5	2.915
20.25	4.25	1.6	12.95	....	T-6	4.330
13.75	3.75	2	5	....	T-8	2.485
1.5	4	1	....	8.5	M-1	1.200
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.590

Tool steel producers include: A4, A8, B2, B8, C4, C9, C12, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+12.25	+27.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Ambridge, Pa. N2	+12.25	....	+5.75	....	+3.25	....	+1.75	....	+1.75	....	+2	....	0.5	....
Lorain, O. N3	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Youngstown Y1	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

ELECTRICWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Alton, Ill. L1	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Benwood, W. Va. W10	1.5	+27	+10.5	+36	+21	+45.5	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Butler, Pa. F6	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+28	+7.75	+24	+4.25	+19.5	+1.75	+18.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+16	4.25	+12	7.75	+7.5	10.25	+6.25
Lorain, O. N3	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sharon, Pa. S4	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sparrows Pt., Md. B2	2.5	+26	+10.5	+36	+21.5	+46	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Wheatland, Pa. W9	4.5	+24	+8.5	+34	+19.5	+44	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.75		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Alton, Ill. L1	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Benwood, W. Va. W10	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Etna, Pa. N2	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Fairless, Pa. N3	9.75	+6.25	10.25	+5.25	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Fontana, Calif. K1	+1.25	+17.25	+0.75	+16.75	0.75	+16.5	0.75	+16.5	+9.75	+27.5	+9.75	+27.5
Indiana Harbor, Ind. Y1	10.75	+5.25	11.25	+4.75	12.75	+4.5	12.75	+4.5	2.25	+15.5	2.25	+15.5
Lorain, O. N3	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sharon, Pa. M6	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Sparrows Pt., Md. B2	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Wheatland, Pa. W9	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Youngstown R2, Y1	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5

*Galvanized pipe discounts based on price of zinc at 11.50c, East St. Louis.

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	Rerolling Ingot	Rerolling Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.75	25.00	....	36.00	....	43.50	39.25	48.50	43.50
202	24.75	28.25	37.75	39.00	42.25	44.50	40.00	49.25	46.75
301	24.00	26.00	38.75	37.25	43.50	46.00	41.25	51.25	45.00
302	26.25	29.50	39.50	40.50	44.25	46.75	42.25	52.00	49.50
302B	26.50	30.75	42.25	45.75	46.75	49.00	44.50	57.00	57.00
303	....	33.25	42.50	....	47.25	49.75	45.00	56.75	56.75
304	28.00	29.50	39.50	40.50	44.25	46.75	45.75	52.00	49.50
304L	....	37.25	47.25	48.25	52.00	54.50	53.50	59.75	57.25
305	29.50	34.75	44.00	47.50	47.00	49.50	46.25	58.75	58.75
308	32.00	36.25	49.00	50.25	54.75	57.75	55.25	63.00	63.00
309	41.25	47.50	60.00	64.50	66.25	69.50	66.00	80.50	80.50
310	51.50	59.50	81.00	84.25	89.75	94.50	87.75	96.75	96.75
314	....	....	80.50	....	89.75	94.50	87.75	....	104.25
316	41.25	47.50	64.50	68.50	71.75	75.75	71.75	80.75	76.75
316L	....	55.25	72.25	76.25	79.50	83.50	79.50	88.50	84.50
317	49.75	58.00	79.75	88.25	89.50	94.25	88.50	101.00	101.00
321	33.50	38.00	48.75	53.50	54.50	57.50	54.75	65.50	62.25
380	....	....	123.25	....	98.75	143.75	135.00	149.25	149.25
18-8 Cb-Ta	38.50	48.25	57.75	63.50	63.75	67.25	64.75	79.25	75.25
403	....	....	26.75	....	29.75	31.50	30.00	40.25	40.25
405	20.25	26.50	30.75	36.00	34.75	36.50	32.50	46.75	46.75
410	17.50	19.50	26.75	31.00	29.75	31.50	30.00	40.25	40.25
416	....	....	29.75	....	33.75	35.50	31.25	48.25	48.25
420	....	31.50	35.50	41.75	40.75	42.75	40.25	62.00	62.00
430	17.75	19.75	29.75	32.00	33.75	35.50	31.00	40.75	38.75
430F	....	....	30.50	....	34.25	36.00	31.75	51.75	42.00
431	....	29.75	39.25	....	43.50	46.00	41.00	56.00	56.00
446	....	....	40.75	59.00	46.00	48.25	42.75	70.00	70.00

Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; Calstrip Steel Corp.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Elwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Phoenix Steel Corp.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Somers Brass Co.; Specialty Wire Co. Inc.; Standard Tube Co.; Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steels, Inc.; Union Steel Corp.; U. S. Steel Corp.; Universal Cyclops Corp.; Vanadium-Alloy Steel Co., Wall Tube & Metal Products Co.; Wallingford Steel, subsidiary of Allegheny Ludlum Steel Corp.; Washington Steel Corp.; Seymour Mfg. Co.

Clad Steel

	Plates: 5%	Plates: Carbon Base 10%	Plates: Carbon Base 15%	Plates: Carbon Base 20%	Sheets: Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	26.05	28.80	31.55	34.30	39.75
304L	30.50	33.75	36.95	40.15	....
316	38.20	42.20	46.25	50.25	58.25
316L	42.30	46.75	51.20	55.65	....
316 Cb	49.90	55.15	60.40	65.65	....
321	31.20	34.50	37.75	41.05	47.25
347	36.90	40.80	44.65	48.55	57.00
405	22.25	24.60	26.90	29.25	....
410	20.55	22.70	24.85	27.00	....
430	21.20	23.45	25.65	27.90	....
Inconel	49.80	61.35	72.80	84.40	....
Nickel	43.20	55.05	66.95	78.90	....
Nickel, Low Carbon	43.50	55.70	67.95	80.35	....
Monel	44.25	55.35	66.45	77.60	....

	Strip, Carbon Base —Cold Rolled— 10%	Strip, Carbon Base —Cold Rolled— Both Sides
Copper*	36.10	43.00

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. P4; Coatesville, Pa. L7; New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Claymont, Del. P4; Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	Hi-Carbon-Cr (D-11)	0.955
Spec. Carbon (W-1)	0.385	V-Cr Hot Work (H-13)	0.550
Oil Hardening (O-1)	0.505	W-Cr Hot Work (H-12)	0.530
V-Cr Hot Work (H-11)	0.505	W Hot Wk (H-21)	1.425-1.44

Grade by Analysis (%) W	Cr	V	Co	Mo	AISI Designation	$ per lb
18	4	1	....	....	T-1	1.840
18	4	2	....	....	T-2	2.005
13.5	4	3	....	....	T-3	2.105
18.25	4.25	1	4.75	....	T-4	2.545
18	4	2	9	....	T-5	2.915
20.25	4.25	1.6	12.95	....	T-6	4.330
13.75	3.75	2	5	....	T-8	2.485
1.5	4	1	....	8.5	M-1	1.200
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.590

Tool steel producers include: A4, A8, B2, B8, C4, C9, C12, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

Prices in dollars per gross ton, f.o.b. (rail) furnace; add 50 cents when shipped by truck. Maximum delivered prices are approximate and based on rail shipment.

Birmingham District	Basic	No. 2 Foundry	Malle-able	Besse-mer
Birmingham R2	62.00	62.50**	66.50	....
Birmingham U6	....	62.50**	66.50	....
Woodward, Ala. W15	62.00*	62.50**	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N. Tonawanda, N.Y. T9	....	66.50	67.00	67.50
Tonawanda, N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester, N.Y., deld.	69.02	69.52	70.02	....
Syracuse, N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S. Chicago R2	66.00	66.50	66.50	67.00
S. Chicago, Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	68.81	69.31	69.31	69.81
Muskegon, Mich., deld.	....	74.46	74.46	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron, Ohio, deld.	69.52	70.02	70.02	70.52
Mid-Atlantic District				
Birdsboro, Pa. B10	68.00	68.50	69.00	69.50
Chester, Pa. P4	Nom.	Nom.	Nom.	....
Swedeland, Pa. A3	68.00	68.50	69.00	69.50
NewYork, deld.	....	75.41	75.91	....
Newark, N.J., deld.	72.53	73.03	73.53	74.03
Philadelphia, deld.	70.18	70.68	71.18	71.68
Troy, N.Y. R2	68.00	68.50	69.00	69.50
Boston, deld.	75.20	75.70	76.20	76.70
Pittsburgh District				
NevilleIsland, Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), deld.	....	68.31	68.31	68.81
Monaca, Pa., deld.	....	68.33	68.33	68.83
Lawrenceville, W. Homestead, Wilmerding, Pa., deld.	....	68.68	68.68	69.18
Verona, Trafford, Pa., deld.	68.83	69.33	69.33	69.83
Brackenridge, Pa., deld.	69.16	69.66	69.66	70.16
Midland, Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard, Ohio Y1	....	....	66.50	....
Sharpsville, Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	....

Other U. S. Districts	Basic	No. 2 Foundry	Malle-able	Besse-mer
Duluth I-3	66.00	66.50	66.50	67.00
Erie, Pa. I-3	66.00	66.50	66.50	67.00
Fontana, Calif. K1	75.00	75.50	....	....
Geneva, Utah C11	66.00	66.50	....	....
GraniteCity, Ill. G4	67.90	68.40	68.90	....
Ironton, Utah C11	66.00	66.50	....	....
Minnequa, Colo. C10	68.00	68.50	69.00	....
Rockwood, Tenn. T3	62.00	62.50‡	66.50	67.00
Toledo, Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.94	73.44	....	....
Mansfield, Ohio, deld.	....	....	71.34	....
Canadian District				
Hamilton, Ont. S46	65.00	65.00	65.50	....
PortColborne, Ont. A25	65.00	65.00	65.50	66.00
SaultSte.Marie, Ont. A25	65.00	65.00	65.50	66.00

*Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.
‡Phos. 0.50% up; Phos. 0.30-0.49%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%. Foundry grade, 1.75% or under, deduct 50c.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.01-6.50% silicon; add 75c for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 13%; starting with silicon over 13% add $1 per ton for each 0.50% silicon or portion thereof up to 14%; over 14%, price is $93 with $1 differential; add $1 for each 0.50% Mn over 1%)

Buffalo H1	$79.25
Jackson, Ohio I-3, J1	78.00
PortColborne, Ont. A25	78.50
Toledo, Ohio I-3	78.00

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.50% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

CalvertCity, Ky. P15	$99.00
NiagaraFalls, N.Y. P15	99.00
Keokuk, Iowa Open-hearth & Fdry, K2	89.00
Keokuk, Iowa O.H. & Fdry, 12½ lb piglets, 16% Si, K2	92.00

LOW PHOSPHORUS IRON, Gross Ton

Birdsboro, Pa. B10 (Phos. 0.075% max)	$73.00
Lyles, Tenn. T3 (Phos. 0.035% max)	73.00
Rockwood, Tenn. T3 (Phos. 0.035% max)	73.00
Buffalo H1 (Intermediate) (0.036-0.075% max)	71.50
Chicago I-3 (Phos. 0.075% max)	71.00
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Phos. 0.075% max)	71.00
Erie, Pa. I-3 (Phos. 0.075% max)	71.00
NevilleIsland, Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Swedeland, Pa. A3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Troy, N.Y. R2 (Phos. 0.075% max)	73.00

Steel Service Center Products

Representative prices, cents per pound, f.o.b. warehouse, for 2000 lb orders. Prices will vary with total weight of the order. City delivery charges are 15 cents per 100 lb except: Denver, 20 cents; Baltimore, Boston, New York, Philadelphia, San Francisco, 10 cents; Atlanta, Birmingham, Dallas, Houston, Los Angeles, Seattle, no charge.

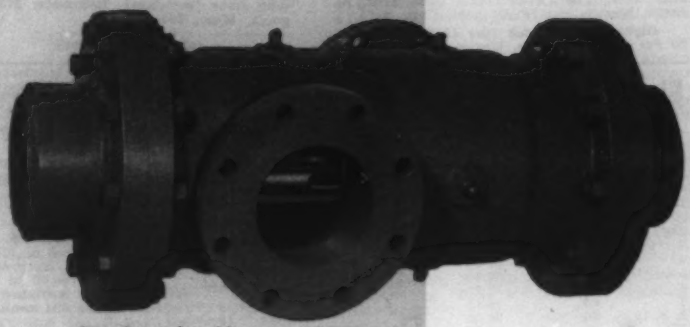
	SHEETS			STRIP	BARS				PLATES	
	Hot Rolled	Cold Rolled	Galv.	Hot Rolled	H.R. Rounds	C.F. Rounds	H.R. Alloy 4140	STRUCTURAL SHAPES	Carbon	Floor
Atlanta	9.37	10.61	11.85	10.85	9.53	13.24	....	9.94	9.73	11.16
Baltimore	9.50	10.26	10.06	11.25	9.65	11.70	16.38	9.85	9.60	11.10
Birmingham	8.46	10.20	10.59	9.45	8.26	13.14	16.65	8.47	8.41	10.05
Boston	9.90	10.40	11.52	12.40	10.05	13.35	16.59	10.50	9.83	11.85
Buffalo	9.30	10.05	11.80	11.70	9.45	11.45	16.30	9.90	9.40	11.80
Charlotte, N. C.	9.95	11.22	10.55	11.35	10.00	12.68	....	10.20	9.95	11.75
Chicago	9.22	10.20	10.13	11.39	9.22	10.65	15.95	9.57	9.06	11.35
Cincinnati	9.38	10.26	10.18	11.71	9.33	11.53	16.27	10.14	9.44	11.68
Cleveland	9.22	10.66	10.92	11.51	9.33	11.25	16.06	9.96	9.30	11.59
Dallas	9.07	9.88	11.75	10.63	8.48	12.98	16.95	8.71	8.31	9.68
Detroit	9.48	10.46	10.50	11.76	9.53	11.01	16.23	10.14	9.43	11.61
Denver	9.41	11.77	12.11	9.86	10.10	11.47	....	10.02	9.69	11.83
Houston	8.67	9.48	11.35	10.23	8.08	13.10	16.55	8.31	7.91	11.57
Indianapolis	9.66	10.64	10.57	11.83	9.66	11.09	16.39	10.01	9.50	11.79
KansasCity	9.21	10.87	11.35	10.87	9.31	11.57	15.72	9.80	9.10	....
Los Angeles	10 35	11.20	12.10	12.40	10.25	14.20	17 35	10.45	10.30	12.30
Memphis, Tenn.	9.63	10.35	10.80	11.29	9.48	12.70	16.53	9.67	9.32	11.18
Milwaukee	9.36	10.34	10.27	11.53	9.36	10.89	16.09	9.79	9.20	11.49
Moline, Ill.	9.57	10.55	11.05	11.74	9.57	11.00	16.30	9.92	9.41	11.70
Newark, N. J.	9.81	10.34	11.54	12.37	10.05	13.25	16.40	10.35	9.79	11.82
New York	10.07	10.78	11.35	12.37	10.44	13.25	16.40	10.90	10.22	11.82
Philadelphia	9.50	10.00	10.66	11.25	9.65	11.95	16.38	9.85	9.60	11.10
Pittsburgh	9.22	10.53	11.63	11.49	9.22	11.25	15.95	9.57	9.06	11.35
Portland, Oreg.	10.40	12.25	12.35	12.40	10.40	16.65	17.85	11.00	10.55	12.70
St. Louis	9.42	10.58	10.51	11.59	9.44	11.28	16.33	9.80	9.28	11.59
St. Paul	9.57	10.24	11.39	11.74	9.57	11.49	16.54	9.92	9.41	11.70
San Francisco	10.65	11.65	11.75	12.70	10.55	15.10	17.25	11.10	10.80	12.95
Seattle	11.35	12.45	13.40	12.80	10.80	16.20	17.85	11.50	10.95	13.60
Spokane, Wash.	11.20	12.30	13.25	12.65	10.65	16.20	17.85	11.35	10.80	13.45

Specifications: Hot rolled sheet, sheared edge, 10 Ga. & 36 x 96-120 in.; cold rolled sheets, 20 Ga. & 36 x 96-120 in.; galvanized sheets, 10 Ga. x 36 x 120 in. except Los Angeles, Dallas and Houston, 10 Ga. x 48 x 120 in.; hot rolled strip, ⅛ in. x 1 in.; hot rolled carbon bars, rounds, ¾ in.—1¼ in., M1020; cold finished bars, 1 in., C1018; hot rolled alloy bars, 4140 annealed, 1⅝ in.—2⅝ in. rounds; structural shapes, I beams, 6 x 12½ in.; carbon plate, sheared, through ½ in. x 84 in.; floor plates, ¼ in. x 36 in.

BIG CONTROL VALVES

up to 8 in. • 5000 psi

2 in., 3-way 3-position, double solenoid type.



8 in., 2-way 2-position, double pilot cylinder type.

Need more flow capacity than you can get with the largest sizes available in most valve lines? There's an easier answer than resorting to costly multiple valving, or redesigning your system to suit flow limitations.

Hunt builds valves in sizes up to 8 in., with air flow ratings of *more than 32,000 cfm @* 100 psi pressure drop! In fact, you can choose from valves ranging in size from ⅛ through 8 in.; 2 and 3-way, 4-way 2 or 3-position; solenoid, remote-pilot or mechanically actuated; with a variety of optional mountings and features.

If control of large volumes of air, oil, water, or soluble oil and water at pressures up to 5000 psi hyd. is one of your requirements, it'll pay you to talk to your Hunt representative. His specialized knowledge can save you hours and dollars. Call him today.

HUNT

QUICK-AS-WINK® AIR AND HYDRAULIC

VALVES

HUNT VALVE COMPANY • DIVISION OF IBEC • SALEM, OHIO

For more information, write for Bulletin 603. Address Hunt Valve Company, Salem, Ohio, Dept. ST-861.

Refractories

Fire Clay Brick (per 1000 pieces*)

High-Heat Duty: Ashland, Grahn, Hitchins, Olive Hill, Ky., Athens, Troup, Tex., Clearfield, Curwensville, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parrall, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., Canon City, Colo., Frostburg, Md., $133; Templeton, Pa., $135; Salina, Pa., $138; Niles, Ohio, $139; Lehi, Utah, $175.

Super-Duty: Ironton, Ohio, St. Louis, Mexico, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Frostburg, Md., $200; Stevens Pottery, Ga., $210; Troup, Tex., $215; Lehi, Utah, $263.

Silica Brick (per 1000 pieces*)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Hawstone, Thompsontown, Pa., Ensley, Ala., Portsmouth, Ohio, St. Louis, $158; Warren, Niles, Windham, Ohio, $163; E. Chicago, Ind., Joliet, Ill., $168; Canon City, Colo., $173; Lehi, Utah, $183; Los Angeles, $185.

Semisilica Brick (per 1000 pieces*)

Woodbridge, N. J., Canon City., Colo., $133; Philadelphia, Clearfield, Pa., $138; Warren, Ohio, $148.

Ladle Brick (per 1000 pieces*)

Dry-Pressed: Alsey, Ill., Johnstown, Pa., Vandalia, Mo., $97; Chester, New Cumberland, W. Va., Freeport, Vanport, Merrill Station, Clearfield, Pa., Wellsville, Irondale, New Salisbury, Ohio, $100; Portsmouth, Ohio, $102; St. Louis, Mexico, Mo., $120; Lehi, Utah, $175.

High-Alumina Brick (per 1000 pieces*)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $250; Danville, Ill., $253; Fords, N. J., Philadelphia, $265; Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., Frostburg, Md., $260; Troup, Tex., $265.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $310; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., Frostburg, Md., $320; Troup, Tex., Fords, N. J., Philadelphia, $325.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $350; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., Frostburg, Md., $360; Troup Tex., Fords, N. J., Philadelphia, $365.

Tar Bonded Brick (per ton)

Dolomite: Nario, Ohio, $87.50. Dolomite-Magnesite: Nario, Ohio, $109.50. Magnetite: Nario, Ohio, $128.

Sleeves (per 1000)

St. Louis, $193; Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., $188; Ottawa, Ill., $205.

Nozzles (per 1000)

Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $310; Reesdale, Pa., $355.

Runners (per 1000)

Johnstown, Bridgeburg, St. Charles, Clearfield, Pa., $234; Reesdale, Pa., $245.

Dolomite (per ton)

Domestic, dead-burned bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Nario, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Mo., $15.60.

Magnesite (per net ton)

Domestic, dead-burned, ½ in. grains with fines, Chewelah, Wash., $46; minus ⅝ in. grains bulk, Luning, Nev., $46; ⅝ in. grains with fines (periclase), Baltimore, $73, Pascagoula, Miss., $90.

*—9 in. x 4½ x 2.50 straights.

Ores

Lake Superior Iron Ore

(Prices effective for the 1961 shipping season, subject to later revision, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi nonbessemer	$11.45
Mesabi bessemer	11.60
Old Range nonbessemer	11.70
Old Range bessemer	11.85
Open-hearth lump	12.70
High phos.	11.45

Based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 1, 1961; increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

New Jersey, concentrates ..... nom.

Foreign Iron Ore

Cents per unit

Swedish basic, 65%, c.i.f. Atlantic ports	25.00†
Chilean, 62-65%, c.i.f. Atlantic ports	22.00
Brazilian (lump), 68.5%, f.o.b. vessel, Victoria, per ton	$11.50

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	$15.75-16.25*
Domestic, concentrates, f.o.b. milling points	22.00-23.00

Manganese Ore

Mn 46-48%, Indian, 85-90c, nom. per long ton unit, c.i.f. U. S. ports, duty for buyer's account.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$34.00-35.00†
48% no ratio	25.00-26.00†

South African Transvaal

44% no ratio	18.75
48% no ratio	24.00-26.00†

Turkish

48% 3:1	35.00-37.00†

Domestic

Rail nearest seller

18% 3:1	30.00

Molybdenum

Sulfide concentrate, per lb of Mo content, fines, unpacked $1.40

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard

55-60%	$3.00-3.50
60-65%	3.60-4.00

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

*Before duty. †Nominal.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Inches Diam	Inches Length	Per 100 lb
2	24	$64.00
2½	30	41.50
3	40	39.25
4	40	37.00
5½	40	36.50
6	60	33.25
7	60	29.75
8, 9, 10	60	29.50
12	72	28.25
14	60	28.25
16	72	27.25
17	60	27.25
18	72	27.00
20	72	26.50
24	84	27.25

CARBON

8	60	14.25
10	60	13.80
12	60	14.75
14	60	14.75
14	72	12.55
17	60	12.65
17	72	12.10
20	90	11.55
24	72, 84	11.95
24	96	12.10
30	84	12.00
35, 40	110	11.60
40	100	12.50

Canadian Steel

(Cents per lb, f.o.b. mill, except as otherwise noted)

Billets, Blooms & Slabs:

Carbon (N.T.):	
Forging	$97.00
Rerolling	78.00
Alloy (N.T.)	115.00
Wire Rods:	
Carbon	5.70
Alloy	6.40
Wire (carload lots):	
Merchant annealed	8.40
Low carbon indus.	7.20
Upholstery spring	8.55
M.B. spring	8.85
Bars & Small Shapes:	
Carbon, merchant	5.30
Carbon, special	5.85
Alloy	6.40

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60%, $33-$36.50. Imported, net ton, f.o.b. cars point of entry, duty paid, metallurgical grade; European, $30-$33, contract; Mexican, all rail, duty paid, $29-$29.50; barge, Brownsville, Tex., $30-$31.

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted.)

	Cents
Sponge Iron, domestic and foreign, 98% Fe, min. trucklots, freight allowed east of Mississippi River:	
100 mesh, bags	11.50
100 mesh, pails	9.85‡
40 mesh, bags	7.50††
Electrolytic Iron,	
Melting stock, 99.9% Fe, irreg. fragments, ⅛ in. x 1.3 in.	27.75
(In contract lots of 750 tons price is 22.75c.)	
Annealed, 99.5% Fe. 36.75, ton deld. east of Mississippi.	
Unannealed (99+% Fe)	33.0
Unannealed (99+% Fe) (minus 325 mesh)	58.0
Carbonyl Iron:	
90-99.9%, 3 to 20 microns, depending on grade, 88.00-700.00 in standard 200-lb containers; all minus 200 mesh.	
Aluminum:	
Atomized, 600-lb drum freight allowed, c.l. 39.80; ton lots	41.80
Brass, 80/20, leaded (60 mesh)	37.80
Bronze powder, 90/10.	56.80
Copper, all types	15.00*
Lead	7.50*
Manganese, 500 lb and up	25.00*
Nickel, all types	0.78-1.06
Nickel-Silver	56.00
Solder	7.00*
Stainless Steel, 304	89.00
Stainless Steel, 316	$1.07
Steel, AISI 4650	32.00
Tin	14.00*
Zinc	23.20

Cobalt:	Dollars
98.5%, minus 100-300 mesh	1.57-1.58
99.5%, below 5 microns	2.32
Molybdenum	4.35

*Plus cost of metal. ‡Depending on mesh. §Cutting and scarfing grades. **Depending on price of ore. ††Welding grade.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa. furnace	$14.75-15.25
Connellsville, Pa. foundry	18.00-18.50

Oven Foundry

Birmingham, ovens	$30.35
Cincinnati, deld.	33.34
Buffalo, ovens	32.00
Chattanooga, Tenn., ovens	30.80
Detroit, ovens	32.00
Pontiac, Mich., deld.	34.05
Saginaw, Mich., deld.	35.63
Erie, Pa., ovens	32.00
Indianapolis, ovens	31.25
Ironton, Ohio, ovens	30.50
Cincinnati, deld.	33.64
Kearny, N. J., ovens	31.25
Milwaukee, ovens	32.00
Neville Island (Pittsburgh), Pa., ovens	30.75
New Haven, Conn., ovens	31.00
Painesville, Ohio, ovens	32.00
Cleveland, deld.	34.45
Philadelphia, ovens	31.00
St. Louis, ovens	33.00
St. Paul, ovens	31.25
Chicago, deld.	34.75
Swedeland, Pa., ovens	31.00
Terre Haute, Ind., ovens	31.25

Imported Steel

(Base per 100 lb. landed, duty paid; based on current ocean rates with any rise for buyer's acc't. Source of shipment: Western Europe, except as noted.)

	North Atlantic	Great Lakes	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$5.65	$5.70	$5.60	$5.50	$5.80
Bar Size Angles	5.85	5.90	5.80	5.70	6.00
Structural Angles	5.75	5.80	5.70	5.60	5.90
I-Beams	5.65	5.70	5.60	5.50	5.80
Channels	5.75	5.80	5.70	5.60	5.90
Plates (basic bessemer)	5.45	5.50	5.40	5.30	5.60
Sheets, hot rolled and galvanized	Nom.	....	Nom.	Nom.	Nom.
Furring Channels, C.R., 1000 ft, ¾ x 0.030 lb per ft	23.66	23.72	23.59	23.31	25.04
Barbed Wire (†)	6.25	6.30	6.20	6.10	6.40
Merchant Bars	5.95	6.00	5.90	5.80	6.10
Hot-Rolled Bands	5.95	6.00	5.90	5.80	6.10
Wire Rods, Thomas No. 5 (Niederrhein)	5.80*	....	5.75	5.75	6.00
Wire Rods, O.H., No. 5 (Niederrhein)	6.00*	....	5.95	5.95	6.20
Wire Rods, O.H. (Sumitoms, Japan)	5.95	....	5.90	5.90	6.05
Bright Common Wire Nails (§)	7.35	7.40	7.30	7.20	7.50

†Per 82 lb net reel. §Per 100-lb keg, 20d nails and heavier. *Except Boston.

Coal Chemicals

(Representative prices)

Cents per gal f.o.b. tank cars or tank trucks, plant.	
Pure benzene	34.00
Xylene, industrial grade	29.00
Creosote	24.00
Naphthalene, 78 deg.	6.00
Toluene, one deg. (deld. east of Rockies)	25.00
Cents per lb, f.o.b. tank cars or tank trucks, deld.	
Phenol, 90 per cent grade	14.75
Per ton bulk, f.o.b. cars or trucks, plant.	
Ammonium sulfate, regular grade	$32.00

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, 10 lb pigs, per gross ton, Palmerton, Pa., 21-23% Mn, $102.50; 19-21% Mn, 1-3% Si, $100; 16-19% Mn. $98. For Neville Island, Pa., prices add $2.50. Lump 35 lb and down: Deduct $2 from 10 lb pig prices at Palmerton.

Standard Ferromanganese: (Mn 74-76%, C 7% approx) base price per net ton, $220, Johnstown, Duquesne, Sheridan, Neville Island, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively (Mn 79-81%). Lump $228 per net ton, f.o.b. Anaconda, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-95%). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 4c for max 0.15% C grade from above prices, 5.3% for max 0.03% C, 6.6c for max 0.5% C, and 8.1c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 24c per lb of contained Mn; packed, carload 25.3c, ton lot of 26.9c, less ton 28.1c.

Electrolytic Manganese Metal: Min carload, bulk, 34.25c; 2000 lb to min carload, 37c; less ton, 39c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi River; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%), Carload, lump, bulk, 1.50% C grade, 18.5-21% Si, 11.6c per lb of alloy. Packed, c.l. 12.8c, ton 13.25c, less ton 14.25c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Rockwood, Tenn.; Houston, Tex.; Sheffied, Ala.; Portland, Oreg. For 2% C grade, Si 16-18.5%, deduct 0.2c from above prices. For 3% grade, Si 12.5-16%, deduct 0.5c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 5% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton to 300 lb. $1. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton to 300 lb $1.27, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract min c.l. $250 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis. Spot, $255.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4%). Contract, c.l. $300 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed. Spot, $305.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: C.l. lump, bulk, 28.75c per lb of contained Cr. Delivered.

Charge Chrome: Cr 58-65%, C 5-7%, Si 4-6%, S 0.03% max, 20.00c per lb of contained Cr, carlots, lump, bulk, delivered.

Blocking Chrome: Cr 55-63%, C 4-6%, Si 8-12%, 23.50c per lb of contained Cr, delivered in carlots, lump, bulk.

Refined Chrome: Cr 58-65%,C 4.25% max, Si 1.0% max, S 0.03%, 21.00c per lb of contained Cr, carlots, lump, bulk, delivered.

Low-Carbon Ferrochrome: (Simplex) Cr 63-66% or 68-71%: C 0.025% max, 31.50c; C 0.010% max, 32.50c per lb of contained Cr, carlots, lump, bulk, delivered.

Cr 68-73%; C 0.25% max, 33.00c. Cr 65-71%; C 0.05% max, 32.00c; C 0.10% max, 31.75c; C 0.20% max, 31.50c; C 0.50% max, 31.25c; C 1.0% max, 31.00c; C 1.5%, 30.75c; C 2.0% max, 30.50c, carlots, lump, bulk, delivered.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). C.l., 2" x D, bulk 30.8c per lb of contained Cr. Packed, c.l. 32.4c, ton 34.2c, less ton 35.7c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25 max). 8M x D, carload, bulk, 20.05c per lb of alloy, carload packed 21.25c, ton lot 22.50c, less ton lot 23.70c. Delivered. Spot, add 0.25c.

Ferrochrome-Silicon: Cr 39-41%, Si 42-45%, C 0.05% max, 22.50c per lb contained Cr and 14.60c per lb contained Si; Cr 33-36%, Si 45-48%, C 0.05% max, 22.50c per lb contained Cr, 14.60c per lb contained Si.

Chromium Metal, Electrolytic: .Commercial grade (C 99.8% min, metallic basis Fe 0.2% max). Contract, carlot packed, 2" x D plate (above ⅛" thick) $.15 per lb, ton lot $1.17, less ton lot $1.19. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open hearth grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55% or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1, $1.05 per lb; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lot, packed, $1.38 per lb contained V_2O_5 freight allowed. Spot, add 5c.

SILICON ALLOYS

50% Ferrosilicon: Carload, lump, bulk, 13.5c per lb contained Si. Packed, c.l. 16.0c, ton lot 17.45c, less ton 19.1c f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Chattanooga, Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Keokuk, Iowa; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Carload, lump, bulk, 15.75c per lb contained silicon. Packed, c.l. 17.75c, ton lot 19.55c, less ton 20.9c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Carload, lump, bulk, 16.9c per lb of contained Si. Packed, c.l. 18.8c, ton lot 20.45c, less ton 21.7c. Delivered. Spot add 0.3c.

90% Ferrosilicon: Carload, lump, bulk, 20c per lb of contained Si. Packed, c.l. 21.65c, ton lot 23.05c, less ton 24.1c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 1.00% max Fe, 0.7% max Ca). C.l. lump, bulk, 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 25.45c. Add 0.5c for max 0.03% Ca grade. Add 0.5c for 0.50% Fe grade analyzing 98.25% min Si.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.85c per lb of alloy; ton lots, packed, 10.85c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l., lump, bulk, 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Carload, bulk, 26.25c per lb of alloy, carload, lump, packed 27.25c, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). $2.45 per lb (all quantities) of contained W. Delivered.

BORON ALLOYS

Ferroboron: 100 lb or more packed (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices 100 lb and over are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload, $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Carbortam: (B 1 to 2%). Lump, carload $320 per ton, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx 3½ lb each and containing 2 lb of Cr). Carload, bulk 19.60c per lb of briquet, in bags 20.70c; 3000 lb to c.l. pallets 20.80c; 2000 lb to c.l. in bags 21.90c; less than 2000 lb in bags 22.80c. Delivered. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Carload, bulk 13.7c per lb of briquet; c.l. packed, bags 14.9c; 3000 lb to c.l., pallets 14.9c; 2000 lb to c.l., bags 16.1c; less ton 17c. Delivered. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). C.l. bulk 14c per lb briquet; c.l. packed, bags 15.2c; 3000 lb to c.l., pallets 15.2c; 2000 lb to c.l., bags 16.4c; less ton 17.3c. Delivered. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si and small sizes, weighing approx 2½ lb and containing 1 lb of Si). Carload bulk 8c per lb of briquet; packed, bags 9.2c; 3000 lb to c.l., pallets 9.6c; 2000 lb to c.l., bags 10.8c; less ton 11.7c. Delivered. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.60 per lb of Mo contained, f.o.b. Langeloth, Pa.

Titanium Briquets: Ti 98.27%, $1 per lb f.o.b. Niagara Falls, N. Y.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 4% max, C 0.1% max). Ton lots 2" x D, $3.45 per lb of contained Cb; less ton lots $3.50 (nominal). Delivered.

Ferrotantalum Columbium: (Cb 44-47% approx, Ta 15% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lots 2" x D, $3.05 per lb of contained Cb plus Ta, delivered; less ton lots, $3.10.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Carload, bulk 19.25c per lb of alloy, c.l. packed ⅛ in. x 12 M 20.00c, ton lot 21.15c, less ton 22.40c. Delivered. Spot, Add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l., packed 20c per lb of alloy, ton lot 21.15c; less ton lot 22.4c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.45c per lb of alloy; ton lot 19.95c; less ton lot 21.20c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Siminal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk, 19.25c. Packed c.l. 20.25c; 2000 lb to c.l. 21.25c; less than 2000 lb 21.75c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $5 for each 1% of P above or below the base). Carload, bulk, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $120 per gross ton.

Ferromolybdenum: (65-70%). Per lb of contained Mo in 2000-lb container, f.o.b. Langeloth and Washington, Pa., $1.89 in all sizes except powdered which is $1.95.

Technical Molybdic-Oxide: Per lb of contained Mo, in cans $1.60; in bags, $1.59, f.o.b. Langeloth and Washington, Pa.

Car Orders Rise in July But Deliveries Decline

Domestic freight car orders in July increased, totaling 2452 units vs. 1214 in June, reports the American Railway Car Institute. In July, 1960, orders totaled only 1306 cars.

Deliveries were down during July, however, amounting to 1229 cars against 3142 in the preceding month, and 3893 in July, 1960. Of the cars delivered in July, 759 were built in commercial shops and 470 in the carriers' own shops.

Car order backlogs as of Aug. 1 showed 5777 units on order in railroad shops and 2867 in commercial shops, a total of 10,644. That compares with 11,821 on July 1, and 26,658 on Aug. 1 last year. Major classifications on order Aug. 1 involved 4002 standard boxcars, 1626 flatcars, 1488 hoppercars, and 1433 refrigerator cars.

Prices on Some Imported Wire Rods Cut Slightly

Importers of European steel note little change in demand on this side of the Atlantic, but report some tightening in deliveries due to seasonal betterment in home markets abroad.

With the closing of the Great Lakes shipping season approaching, and the eventual cutting off of that market, Niederrhein Steel has reduced its wire rod prices 10 cents per 100 pounds at other U. S. ports for November and December production.

Under the new schedule, prices at the Gulf and South Atlantic ports will be $5.65 per 100 pounds for Thomas quality and $5.85 for open hearth; Northeast (except Boston) $5.70 and $5.90; Boston, $5.85 and $6.05; West Coast, $5.90 and $6.10.

A Japanese producer (Sumitomo) has announced open hearth wire rod prices for fourth quarter production as follows: Gulf Coast and South Atlantic, $5.90 per 100 pounds; East Coast, $5.95; West Coast, $6.05. Those prices are unchanged at levels set up for the second and third quarters of this year.

Tubular Goods . . .

Tubular Goods Prices, Page 111

Youngstown Sheet & Tube Co., Youngstown, has reinstated a 5 per cent discount on prices of rigid steel conduit. The discount was suspended about two months ago. It's thought the latest action may bring down published quotations of other conduit makers as well as those of aluminum conduit producers.

Last spring, a 5 per cent discount on conduit was put into effect for the period ended June 30. On July 1, the discount was suspended, automatically raising prices. However, orders didn't come in the volume hoped for. Sheet & Tube explains resumption of the discount as a move taken to meet competitive conditions.

Merchant pipe shipments are available from stocks. Substantial tonnage is moving to construction projects over the country. The recent flurry in Midwest demand for plates to be used in pipeline fabrication has faded out. However, a Southern pipe mill has received an order for an additional 84 miles of pipe.

The tempo of rotary oil drilling continues to increase. The U. S.-Canadian count showed 2009 rigs operating in the week ended Aug. 14, the highest total since Dec. 26, 1960. It was 30 rigs above the preceding week.

Plates . . .

Plate Prices, Page 105

Platemakers are encouraged by a slight improvement in demand from some directions. The over-all market situation is mixed, but the general trend appears to be upward. Service centers are buying more actively, while ship and railroad work is a shade better. Some producers report lagging demand on light tank and boiler accounts.

Demand for construction is promising, especially for producers of universal plate. Alloy plate needs of the chemical industry are fairly active.

Mill delivery promises on sheared carbon plates now range three to four weeks against two to three recently. Alloy plate shipments extend up to eight weeks, depending on specifications.

Graver Tank & Mfg. Co., a division of Union Tank Car Co., booked a $3 million order for steel plates to be used in constructing Titan missile training sites at Vandenberg Air Force Base, Calif.

Naval shipyards are placing heavier subcontracts for hemispherical heads for submarine hulls to be fabricated from Grade Hy-80 tensile alloy. One contract calls for 15 units to be let by the Navy direct.

The flurry in demand for plates on pipeline account in the Midwest has subsided.

Blast Furnace Production Slips Slightly in July

Blast furnace production (pig iron, ferromanganese, and spiegeleisen) in July totaled 5,647,131 net tons, down slightly from the 5,730,198 tons produced in the preceding month, but up sharply from the 4,523,497 tons produced in July, 1960. Of total production, 49,779 tons were ferromanganese and spiegeleisen vs. 43,064 tons in June and 43,353 tons in July a year ago.

Output in the first seven months this year amounted to 34,384,411 tons (280,813 tons ferroalloys) vs. 46,097,720 tons (452,544 tons ferroalloys) in the same period of last

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year. The breakdown of July production by states:

Blast Furnace Production—July, 1961
(Net tons)

States:	July	First 7 Months
New York	337,128	1,892,003
Pennsylvania	1,296,493	8,096,100
Md., Va., W. Va.	515,450	3,303,662
Ky., Tenn., Tex.	149,371	878,828
Alabama	333,510	1,977,154
Ohio	930,378	5,771,121
Indiana	809,649	4,849,283
Illinois	461,388	2,527,168
Mich., Minn.	398,422	2,541,950
Colo., Utah, Calif.	415,342	2,547,142
Totals	5,647,131*	34,384,411**

*Includes 49,779 tons of ferromanganese and spiegeleisen.
**Includes 280,813 tons of ferromanganese and spiegeleisen.
Data from American Iron & Steel Institute.

Pig Iron . . .

Pig Iron Prices, Page 112

Merchant pig iron sellers report a mild pickup in business this month and look for a more appreciable gain after Labor Day. Foundries are buying limited tonnages, relying on cast scrap to a large extent in their furnace melts.

A large portion of merchant iron output in the Buffalo district is going into the export market.

More idle blast furnaces are resuming production. U. S. Steel blew in a stack at its Carrie Furnaces, Rankin, Pa., Republic Steel has added a second stack at Youngstown, and Colorado Fuel & Iron is activating a furnace at its E. & G. Brooke Plant, Birdsboro, Pa., that has been idle almost a year.

Iron ore . . .

Iron Ore Prices, Page 114

Improved steelmaking operations are being reflected in a stepping up of shipping on the Great Lakes. Four ore carriers have been added to the active lake fleet in recent weeks. The number of vessels in commission in the ore trade as of Aug. 15 stood at 143 vs. 139 on July 15 and 159 a year ago.

Trip capacity now in commission stands at 2,054,200 tons, equal to 73.84 per cent of total capacity of 2,781,925 tons. It compares with 71.25 per cent on July 15 and 73.48 per cent on Aug. 15 a year ago.

Imports of iron ore in May totaled 2,040,864 long tons valued at $19,729,205, reports the U. S. Census Bureau. Imports in April totaled 1,266,485 tons valued at $11,899,054. The total in May, 1960, was 3,715,606 tons valued at $34,653,966.

In the January-May period this year imports amounted to 7,828,764 tons valued at $75,373,268. That was down sharply from the 13,149,928 tons valued at $120,026,892 tons brought into the country in the same period last year. Imports by countries in May and to date this year:

Iron Ore Imports—May, 1961
(Long tons)

Source	May	January–May 1961	1960
Algeria	.....	.....	20,299
Brazil	71,418	351,706	574,505
British W. Africa	.....	.....	14,150
Canada	594,788	710,314	1,815,722
Chile	187,400	886,077	1,822,040
Cuba	.....	.....	2,820
Denmark	.....	.....	443
Republic of Guinea	.....	.....	5,672
Liberia	26,151	271,901	509,856
Mexico	16,581	39,014	77,614
Peru	129,080	495,664	1,532,255
Philippines	.....	.....	1,000
Portuguese Asia	.....	.....	33,251
Sweden	.....	12,200	13,694
Spain	.....	100	180
Union of S. Africa	11,090	11,090	.....
United Kingdom	.....	2,116	120
Venezuela	1,004,356	5,048,582	6,726,307
Totals	2,040,864	7,828,764	13,149,928

Iron Ore Statistics—June, 1961

Inventories of Iron Ore—June, 1961
(Gross tons)

Stocks	U. S. Iron Ores L. Sup.	U. S. Iron Ores Other	Canadian Iron Ores L. Sup.	Canadian Iron Ores Other	Foreign Ores	Total
At U. S. Furnaces						
Start of Month	25,883,022	3,336,919	1,240,799	2,903,380	16,898,293	50,262,413
End of Month in						
Mass., N. Y.	2,144,808	23,864	59,009	171,184	299,171	2,698,036
Pennsylvania	5,860,793	399,541	21,563	71,003	8,025,000	14,377,900
Md., Va., W. Va.	511,665	7,479	.....	1,224,035	2,656,717	4,399,896
Ky., Tenn., Tex.	289,780	160,729	.....	181,617	76,646	708,772
Alabama	871	1,706,314	.....	108,025	3,639,181	5,454,391
Ohio	7,502,224	20,601	615,583	1,400,142	1,262,238	10,800,788
Indiana	6,018,408	28,579	343,098	45	52,680	6,442,810
Illinois	3,705,562	55,189	19,529	.....	216,783	3,997,063
Mich., Minn.	2,718,672	.....	243,669	22,853	283,549	3,268,743
Colo., Utah, Calif.	.....	856,378	.....	.....	10,991	867,369
Undistributed	445	2,346	.....	.....	554	3,345
End of Month total	28,753,228	3,261,020	1,302,451	3,178,904	16,523,510	53,019,113
At U. S. Docks	2,652,751	.....	215,327	891,898	2,354,890	6,114,866
Total U. S. Stocks	31,405,979	3,261,020	1,517,778	4,070,802	18,878,400	59,133,979
Canadian Stocks	1,780,725	.....	78,451	239,062	63,626	2,161,864
Total U. S.-Canada	33,186,704	3,261,020	1,596,229	4,309,864	18,942,026	61,295,843

Iron Ore Consumption—June 1961
(Gross tons)

Consumption	U. S. Iron Ores L. Sup.	U. S. Iron Ores Other	Canadian Iron Ores L. Sup.	Canadian Iron Ores Other	Foreign Ores	Total
In U. S.:						
Mass., N. Y.	396,417	26,352	21,601	11,589	39,165	495,124
Pennsylvania	794,473	277,989	2,282	49,982	651,071	1,775,797
Md., Va., W. Va.	120,804	14,682	.....	278,028	367,377	780,891
Ky., Tenn., Tex.	42,110	80,233	.....	55,216	29,619	207,178
Alabama	.....	346,843	.....	6,589	180,068	533,500
Ohio	1,079,291	5,919	57,534	106,810	136,309	1,385,863
Indiana	1,187,953	.....	104,209	979	15,779	1,308,920
Illinois	612,052	32,438	14,541	.....	35,327	694,358
Mich., Minn.	528,521	337	66,636	19,946	51,446	666,886
Colo., Utah, Calif.	.....	695,166	.....	.....	1,029	696,195
Undistributed	115	51	.....	.....	89	255
In U. S.:						
Blast Furnaces	3,158,039	984,667	128,547	198,816	473,852	4,943,921
Steel Furnaces	132,792	56,146	26,529	14,464	415,278	645,209
Sintering Plants	1,470,829	439,197	111,727	315,859	618,149	2,955,761
Miscellaneous	76	.....	.....	.....	.....	76
Total U. S.	4,761,736	1,480,010	266,803	529,139	1,507,279	8,059,541
In Canada:						
Blast Furnaces	224,819	.....	15,285	96,829	4,495	341,428
Steel Furnaces	.....	.....	.....	25,264	11,221	36,485
Sintering Plants	93,176	.....	89,973	33,577	.....	216,726
Total Canada	317,995	.....	105,258	155,670	15,716	594,639
Total U. S.-Canada	5,079,731	1,480,010	372,061	684,809	1,522,995	9,139,606

Data from the American Iron Ore Association.

QUANTITY PRODUCTION OF GREY IRON CASTINGS

ONE OF THE NATION'S LARGEST AND MOST MODERN PRODUCTION FOUNDRIES

ESTABLISHED 1866

THE WHELAND FOUNDRY

DIVISION OF GORDON STREET, INC.

CHATTANOOGA 2, TENN.

Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including brokers' commission, as reported to STEEL, Aug. 23, 1961. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Aug. 23	$38.33
Aug. 16	38.33
July Avg.	37.10
Aug. 1960	32.33
Aug. 1956	57.13

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	35.00-36.00
No. 2 heavy melting	29.00-30.00
No. 1 dealer bundles	36.00-37.00
No. 2 bundles	*24.00-25.00*
No. 1 busheling	35.00-36.00
No. 1 factory bundles	46.00-47.00
Machine shop turnings	14.00-15.00
Mixed borings, turnings	14.00-15.00
Short turnings	19.00-20.00
Cast iron borings	18.00-19.00
Cut structurals:	
2 ft and under	42.00-43.00
3 ft and under	39.00-40.00
Heavy turnings	27.00-28.00
Punchings & plate scrap	43.00-44.00
Electric furnace bundles	43.00-44.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	34.00-35.00
Stove plate	34.00-35.00
Unstripped motor blocks	24.00-25.00
Clean auto cast	35.00-36.00
Drop broken machinery	45.00-46.00‡

Railroad Scrap

No. 1 R.R. heavy melt.	40.00-41.00
Rails, 2 ft and under	50.00-51.00
Rails, 18 in. and under	51.00-52.00
Random rails	45.00-46.00
Angles, splice bars	44.00-45.00
Railroad specialties	46.00-47.00
Rails, rerolling	59.00-60.00

Stainless Steel Scrap

18-8 bundles & solids	180.00-185.00
18-8 turnings	105.00-110.00
430 bundles & solids	85.00-90.00
410 turnings	50.00-55.00

CHICAGO

No. 1 hvy melt., indus.	40.00-41.00
No. 1 hvy melt., dealer	38.00-39.00
No. 2 hvy melting	33.00-34.00
No. 1 factory bundles	43.00-44.00
No. 1 dealer bundles	39.00-40.00
No. 2 bundles	23.00-24.00
No. 1 busheling, indus.	40.00-41.00
No. 1 busheling, dealer	38.00-39.00
Machine shop turnings	*16.00-17.00*
Mixed borings, turnings	*18.00-19.00*
Shovel turnings	*18.00-19.00*
Cast iron borings	*18.00-19.00*
Cut structurals, 3 ft	44.00-45.00
Punchings & plate scrap	44.00-45.00

Cast Iron Grades

No. 1 cupola	42.00-43.00
Stove plate	37.00-38.00
Unstripped motor blocks	33.00-34.00
Clean auto cast	47.00-48.00
Drop broken machinery	47.00-48.00

Railroad Scrap

No. 1 R. R. heavy melt.	42.00-43.00
R.R. malleable	47.00-48.00
Rails, 2 ft and under	49.00-50.00
Rails, 18 in. and under	50.00-51.00
Angles, splice bars	46.00-47.00
Axles	56.00-57.00
Rails, rerolling	*59.00-60.00*

Stainless Steel Scrap

18-8 bundles, solids	190.00-195.00
18-8 turnings	110.00-115.00
430 bundles & solids	95.00-100.00
430 turnings	55.00-60.00

BUFFALO

No. 1 heavy melting	31.00-32.00
No. 2 heavy melting	26.00-27.00
No. 1 bundles	31.00-32.00
No. 2 bundles	24.00-25.00
No. 1 busheling	31.00-32.00
Shovel turnings	17.00-18.00
Machine shop turnings	13.00-14.00
Cast iron borings	15.00-16.00
Low phos. structurals and plates, 2 ft and under	39.00-40.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	37.00-38.00
No. 1 machinery	44.00-45.00

Railroad Scrap

Rails, random lengths	42.00-43.00
Rails, 3 ft and under	48.00-49.00
Railroad specialties	41.00-42.00
Rails, rerolling	63.50-64.50

CLEVELAND

No. 1 heavy melting	36.00-37.00
No. 2 heavy melting	24.00-25.00†
No. 1 factory bundles	42.00-43.00
No. 1 bundles	36.00-37.00
No. 2 bundles	23.00-24.00†
No. 1 busheling	36.00-37.00
Machine shop turnings	12.00-13.00
Shovel turnings	16.00-17.00
Mixed borings, turnings	16.00-17.00
Cast iron borings	16.00-17.00
Cut foundry steel	34.00-35.00
Cut structurals, plate, 2 ft and under	41.00-42.00
Low phos, punchings & plate	37.00-38.00
Alloy free, short shovel turnings	18.00-19.00
Electric furnace bundles	38.00-39.00

Cast Iron Grades

No. 1 cupola	39.00-40.00
Charging box cast	26.00-27.00
Heavy breakable cast	28.00-29.00
Stove plate	36.00-37.00
Unstripped motor blocks	31.00-32.00
Brake shoes	37.00-38.00
Clean auto cast	47.00-48.00
Burnt cast	32.00-33.00
Drop broken machinery	48.00-49.00

Railroad Scrap

R.R. malleable	48.00-49.00
Rails, 2 ft and under	49.00-50.00
Rails, random lengths	45.00-46.00
Rails, 18 in. and under	50.00-51.00
Cast steel	42.00-43.00
No. 1 railroad cast	49.00-50.00
Railroad specialties	44.00-45.00
Angles, splice bars	45.00-46.00
Rails, rerolling	50.00-57.00

Stainless Steel Scrap (Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	160.00-165.00
18-8 turnings	95.00-100.00
430 clips, bundles, solids	80.00-85.00
430 turnings	15.00-25.00†

YOUNGSTOWN

No. 1 heavy melting	39.00-40.00
No. 2 heavy melting	25.00-26.00†
No. 1 busheling	40.00-41.00
No. 1 bundles	40.00-41.00
No. 2 bundles	25.00-26.00†
Machine shop turnings	14.00-15.00†
Shovel turnings	19.00-20.00†
Cast iron borings	19.00-20.00†
Low phos.	41.00-42.00
Electric furnace bundles	41.00-42.00

Railroad Scrap

No. 1 R.R. heavy melt.	41.00-42.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	33.00-34.00
No. 2 heavy melting	28.00-29.00
No. 1 bundles	34.00-35.00
No. 2 bundles	20.50-21.50
No. 1 busheling	33.00-34.00
Machine shop turnings	9.00-10.00
Mixed borings, turnings	11.00-12.00
Shovel turnings	12.00-13.00
Cast iron borings	11.00-12.00
Low phos. 18 in.	40.00-41.00

Cast Iron Grades

No. 1 cupola	34.00-35.00
Heavy breakable cast	28.00-29.00
Charging box cast	34.00-35.00
Drop broken machinery	46.00-47.00

Railroad Scrap

No. 1 R.R. heavy melt.	36.00-37.00
Rails, 18 in. and under	47.00-48.00
Rails, random lengths	41.00-42.00

ST. LOUIS (Brokers' buying prices)

No. 1 heavy melting	35.00
No. 2 heavy melting	29.00
No. 1 bundles	35.00
No. 2 bundles	24.00
No. 1 busheling	34.00
Machine shop turnings	13.50
Shovel turnings	17.00

Cast Iron Grades

No. 1 cupola	37.00
Charging box cast	34.00
Heavy breakable cast	32.00
Unstripped motor blocks	34.00
Clean auto cast	38.00
Stove plate	33.00

Railroad Scrap

No. 1 R.R. heavy melt.	38.50
Rails, random lengths	*40.00*
Rails, rerolling	55.00
Rails, 18 in. and under	44.00†
Railroad specialties	*42.00*
Angles, splice bars	40.00†

PHILADELPHIA

No. 1 heavy melting	40.00
No. 2 heavy melting	36.00
No. 1 bundles	43.00
No. 2 bundles	24.00-26.00
No. 1 busheling	43.00
Electric furnace bundles	44.00
Mixed borings, turnings	17.00†
Shovel turnings	20.00
Machine shop turnings	14.00
Heavy turnings	25.00†
Structurals & plates	44.00-46.00
Couplers, springs, wheels	45.00
Rail crops, 2 ft & under	51.00-53.00

Cast Iron Grades

No. 1 cupola	40.00
Heavy breakable cast	40.00
Drop broken machinery	49.00-50.00†
Malleable	49.00†

NEW YORK (Brokers' buying prices)

No. 1 heavy melting	30.00-31.00
No. 2 heavy melting	23.00-24.00
No. 1 bundles	30.00-31.00
No. 2 bundles	20.00-21.00
Machine shop turnings	4.50-5.00†
Mixed borings, turnings	5.00-5.50†
Shovel turnings	6.00-7.00†
Low phos. structurals & plates	34.00-35.00

Cast Iron Grades

No. 1 cupola	34.00-35.00
Unstripped motor blocks	25.00-26.00
Heavy breakable	31.00-32.00

Stainless Steel

18-8 sheets, clips, solids	160.00
18-8 borings, turnings	70.00-75.00
410 sheets, clips, solids	40.00-45.00
430 sheets, clips, solids	55.00-60.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	28.50-29.00
No. 2 heavy melting	25.00-26.00
No. 1 bundles	28.00-29.00
No. 1 busheling	28.50-29.00
Machine shop turnings	5.00-6.00
Shovel turnings	9.00-9.50
No. 1 cast	39.00-40.00
Mixed cupola cast	32.00-33.00
No. 1 machinery cast	40.00-42.00

DETROIT (Brokers' buying prices)

No. 1 heavy melting	32.00-33.00
No. 2 heavy melting	25.00-26.00
No. 1 bundles	35.00-36.00
No. 2 bundles	23.00-24.00
No. 1 busheling	31.00-32.00
Machine shop turnings	10.00-11.00
Mixed borings, turnings	11.00-12.00
Shovel turnings	12.00-13.00

Cast Iron Grades

No. 1 cupola	32.00-33.00
Mixed cast	30.00-31.00
Stove plate	27.00-28.00
Heavy breakable	26.00-27.00
Unstripped motor blocks	22.00-23.00
Clean auto cast	39.00-40.00

Stainless Steel Scrap

18-8 bundles & solids	170.00-175.00
18-8 turnings	70.00-75.00
430 bundles & solids	70.00-75.00

BIRMINGHAM

No. 1 heavy melting	37.00-38.00
No. 2 heavy melting	30.00-31.00
No. 1 bundles	37.00-38.00
No. 2 bundles	22.00-23.00
No. 1 busheling	38.00-39.00
Cast iron borings	10.00-11.00
Machine shop turnings	18.00-19.00
Shovel turnings	20.00-21.00
Bar crops and plate	42.00-43.00
Structurals & plate	42.00-43.00
Electric furnace bundles	38.00-39.00
Electric furnace:	
3 ft and under	36.00-37.00
2 ft and under	37.00-38.00

Cast Iron Grades

No. 1 cupola	42.00-43.00
Stove plate	42.00-43.00
Unstripped motor blocks	31.00-32.00
No. 1 wheels	34.00-35.00

Railroad Scrap

No. 1 R.R. heavy melt.	39.00-40.00
Rails, 2 ft and under	46.00-47.00
Rails, random lengths	41.00-42.00
Angles, splice bars	43.00-44.00

HOUSTON

(Brokers' buying prices; f.o.b. car)

No. 1 heavy melting	35.00
No. 2 heavy melting	31.00-32.00
No. 1 bundles	38.00-39.00
No. 2 bundles	23.00-24.00
Machine shop turnings	12.50-13.00
Crushed turnings	17.00
Low phos. plate & structurals:	
3 ft	41.00-42.00
2 ft and under	45.00-46.00

Cast Iron Grades

No. 1 cupola	*40.50-41.50*
Heavy breakable	25.00-26.00
Foundry malleable	29.00-30.00
Unstripped motor blocks	30.00-31.00

Railroad Scrap

R.R. heavy melt. (3 ft)	40.00-41.00

LOS ANGELES

No. 1 heavy melting	40.00-41.00
No. 1 hvy melt (export)	42.00-44.00
No. 2 heavy melting	37.00-39.00
No. 2 hvy. melt (export)	41.00
No. 1 bundles	34.00-35.00
No. 2 bundles	26.00-28.00
No. 2 bundles (export)	28.00-30.00
Machine shop turnings	15.00-17.00
Shovel turnings	15.00-17.00
Cast iron borings	16.00-17.00
Electric furnace scrap	50.00

Cast Iron Grades

No. 1 cupola	44.00-46.00

Railroad Scrap

No. 1 R.R. heavy melt.	43.00-45.00

PORTLAND, OREG. (Prepared, f.o.b. car)

No. 1 heavy melting	44.00-45.00
No. 2 heavy melting	41.00-42.00
No. 2 bundles	31.00
Shovel turnings	18.00
Electric furnace	54.00

Cast Iron Grades

No. 1 cupola	41.00
Heavy breakable	38.00
Unstripped motor blocks	39.00
Stove plate (f.o.b. plant)	37.00

SEATTLE (Prepared, f.o.b. car)

No. 1 heavy melting	46.00
No. 1 hvy (unprepared)	41.00
No. 2 heavy melting	43.00
No. 2 hvy (unprepared)	38.00
No. 2 bundles	32.00
Shovel turnings	16.00-18.00
Electric furnace	52.00

Cast Iron Grades

No. 1 cupola	41.00
Heavy breakable cast	38.00
Stove plate (f.o.b. plant)	36.00
Unstripped motor blocks	37.00

SAN FRANCISCO

No. 1 heavy melting	43.00**
No. 2 heavy melting	40.00**
No. 1 bundles	34.00**
No. 2 bundles	28.00**
Machine shop turnings	18.00
Mixed borings, turnings	18.00
Cast iron borings	18.00
Heavy turnings	18.00
Shovel turnings	18.00

Cast Iron Grades

No. 1 cupola	46.00
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	45.00-46.00
No. 1 wheels	34.00

HAMILTON, ONT.

(Brokers' buying prices; net tons)

No. 1 heavy melting	31.00
No. 2 hvy melt, 2 ft & under	30.00
No. 1 bundles	31.00
No. 2 bundles	23.50
Mixed steel scrap	23.00
Mixed borings, turnings	12.00
Busheling, new factory:	
Prepared	31.00
Unprepared	25.00
Shovel turnings	12.00

Cast Iron Grades‡

No. 1 machinery cast	32.00

**Based mainly on export sales.
†Nominal.
‡F.o.b. Hamilton, Ont.
§Delivered.

Scrapmen Bank on Fall Upturn

Brokers and dealers anticipate substantial order volume to be stimulated by rising steelmaking operations after Labor Day. STEEL's price composite holding at $38.33

Scrap Prices, Page 118

● **Chicago**—With the leading mills out of the market or buying sparingly, prices are unchanged. No significant buying seems likely until after Labor Day when it's expected that steelmaking operations will begin a slow but steady upturn. That projection will suffer a jolting setback if there's a work stoppage in the auto industry.

● **Philadelphia** — Prices are unchanged. Traders report a slight improvement in domestic mill buying and somewhat better than expected export demand. However, there has not been enough business to affect prices. Exports from this port in August are expected to equal the 58,265 tons shipped in July. Shipments totaled 50,800 tons in June and 100,745 in May.

● **New York**—While scrap prices are unchanged, and have shown little variation over the last several weeks, a stronger tone is developing in the market as fall approaches and steelmaking operations tend upward.

● **Boston** — Buying for domestic consumption is light with prices nominal. For export, switching charges at Boston have been increased $15 to $20 a ton, depending on interterminal location and connections.

● **Pittsburgh**—The market is quiet but firm. Leading dealers are building up their stocks as steelmaking operations rise. A local consumer is taking shipments of No. 2 bundles purchased recently. Fisher Body Div., General Motors Corp., is offering 4600 tons of No. 1 factory bundles on its September list, vs. 3100 tons in August. Brokers are expected to bid $1 to $2 a ton higher than last month.

● **Cleveland** — Bids on September industrial lists are expected to point the way for prices over the next several weeks. Barring an automotive strike, auto scrap tonnage should be heavier next month. For the present, the market is quiet with prices unchanged. The last representative mill purchase involved 5000 tons of steelmaking scrap at $37 for No. 1 heavy melting. The order was divided among several brokers and dealers. In Youngstown, the market is quiet, but some area mills are reported taking in scrap from Pittsburgh and Buffalo.

● **Buffalo**—District foundries have placed some orders for cast iron scrap at quoted prices, reflecting the steady market that has prevailed for some weeks. The cast purchases constituted the outstanding development in the market recently.

● **Cincinnati** — The market continues strong and the trade appears confident prices will go up $1 to $2 a ton when two area mills resume buying next month.

● **St. Louis**—The market is in the doldrums. No scrap is moving to the mills. They apparently have adequate supplies to support current operations. In some grades of scrap there isn't enough trading to establish a market and prices are nominal.

● **Birmingham**—Prices are steady here but quotations on the cast grades appear to be weak. One area foundry bought some cast last week. Otherwise the market was inactive.

● **Houston**—Scrap is moving slowly to yards and mills. Also, export demand is sluggish. Country scrap collections are not expected to increase for another month or so. Spot export demand at Baton Rouge, La., and New Orleans has generated strong prices for No. 1 heavy melting—up to $44 in some instances. In Houston, export prices are unchanged, but exporters are worried about meeting future moderate commitments.

● **San Francisco**—Some local buying of steel scrap is reported, but the tonnages are small and the prices quoted in such transactions vary $1 and $2 a ton above or below the generally recognized market level.

● **Seattle**—Increased domestic demand has firmed up the market. Prices are unchanged. It's expected Japanese buyers will shortly begin placing their fourth quarter requpirements.

Structural Shapes . . .

Structural Shape Prices, Page 105

Structural market activity is encouraging despite continued labor disruptions in the East, noticeably in New York City where concrete mix truck drivers are delaying much

(*Please turn to Page* 123)

Lead-Zinc Legislation Gains Favor

Nonferrous Metal Prices, Pages 122 & 123

THE ODDS are becoming shorter that this session of Congress will pass some kind of a bill to help the lead-zinc industry. Reason: A favorable shift in White House support of the mine states.

Rep. Ed Edmondson (D., Okla.), sponsor of a bill to grant subsidies to small miners (see STEEL, Aug. 14, p. 200), told STEEL last week: "We have a fighting chance to get our entire program—legislation and appropriations—through Congress this session. We have much more aggressive White House backing now." That has been the missing element for some time, but apparently efforts of the mine state congressmen to hold President Kennedy to campaign promises of aid are bearing fruit.

• **Where It Stands**—The Edmondson bill won an important point last week when the House Rules Committee cleared it for floor action. But backers are not quite as certain of its chances from there on. The main hurdle remaining is House Speaker Sam Rayburn, who has not committed himself on the matter. But Representative Edmondson is hopeful of getting bipartisan support for the bill.

Assuming it gains House approval —backers are optimistic about this— it runs smack into an opposing bill passed by the Senate Interior Committee. (That bill favors a tariff-subsidy combination.) However, it is reported that already a compromise is being worked out, indicating that senators as well as representatives sense the change of White House sentiment toward lead-zinc legislation. If the Senate passes a compromise bill, differences must then be settled by a joint conference and the legislation returned to both houses for final passage.

• **Roadblocks**—Despite the change in odds, there isn't much betting on the outcome. The opposition is still firm on both subsidies and tariffs. In addition, a source close to Capitol Hill says that the Berlin crisis and the talk about the administration's fiscal responsibility will temper many feelings toward aid to lead-zinc producers.

Biggest problem of all, though, seems to be time. Representative Edmondson asserts that the House will not adjourn before Sept. 10, perhaps not until late September. The Senate is likely to remain in session even longer. The situation could be cleaned up in that time. But one representative wearily told STEEL: "We are all very tired here and want to go home." Representative Edmondson may not get the three weeks he needs.

Metal Profits Lag Sales Pickup

	Total Income—First Half		Net Profits—First Half	
	1961	1960	1961	1960
Aluminium Ltd.	$252,640,000	$264,321,000	$15,112,000	$21,819,000
American Metal Climax Inc.	287,370,000	353,368,000	15,519,000	19,765,000
American Smelting & Refining Co.	250,518,700	280,203,500	8,620,800	13,998,400
Anaconda Co.	67,680,000	82,000,000	26,530,000	27,150,000
Cerro Corp.	94,274,679	84,045,928	2,735,496	5,760,599
Kaiser Aluminum & Chemical Corp.	206,436,000	214,260,000	10,645,000	11,737,000
Kennecott Copper Corp.	259,558,992	253,152,604	36,281,898	42,660,746
Molybdenum Corp. of America	12,392,483	8,212,737	360,051	106,831
Olin Mathieson Chemical Corp.	355,362,732	353,121,049	14,401,884	18,665,887
Revere Copper & Brass Inc.	110,310,483	115,639,096	3,923,104	3,831,305

DESPITE improvement in second quarter sales by some metal producers over those of the first period and the similar 1960 period, both sales and profits for the first six months were generally below the year-ago marks. (See tabulation at left.) Of the ten companies shown, only four managed to improve sales, and only one of those—Molybdenum Corp.—showed better profits. Revere was the only one showing increased profits on decreased sales.

But the outlook is improving. Since mid-July, sales of mill products have looked a little stronger, and there is wide agreement that the second half trend will follow the upward path of the economy in general. Though competition continues to be fierce, there appears to be less price cutting, which should help profits keep pace with sales.

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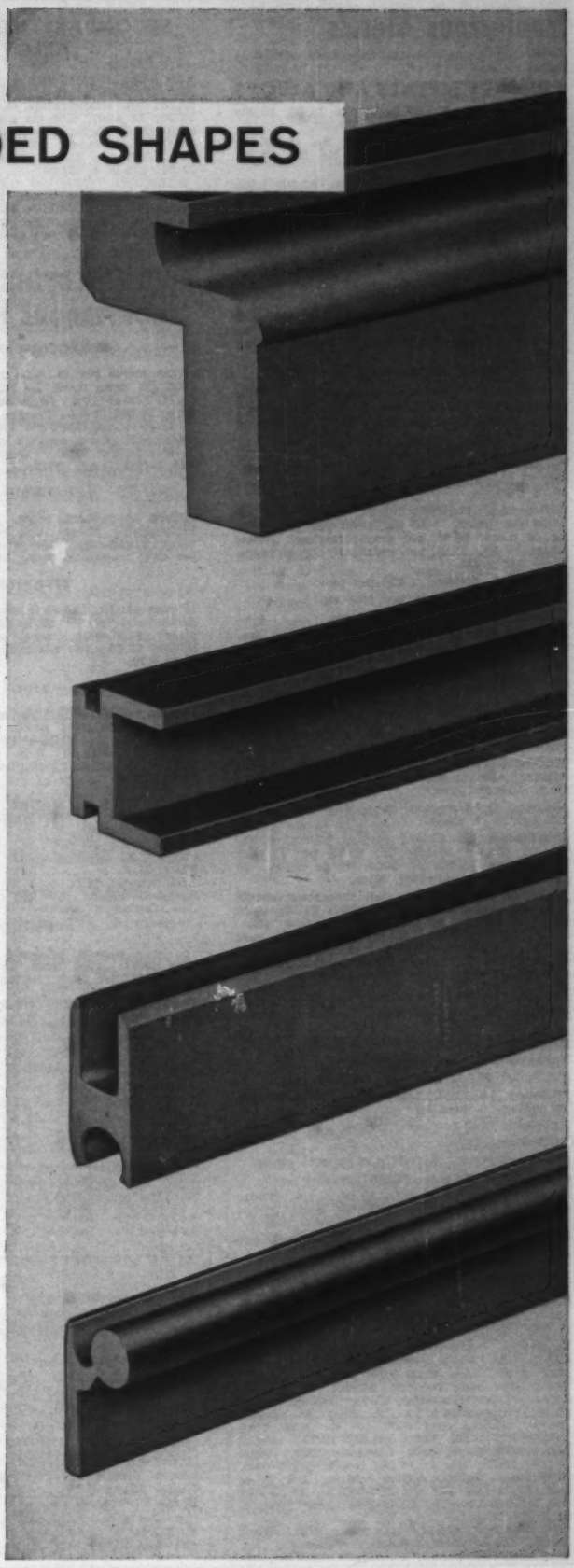

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PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, 50 lb ingots, 26.00, 30,000 lb or more, f.o.b. customer custody.

Aluminum Alloy: No. 13, 25.90; No. 43, 26.20; No. 195, 27.60; No. 214, 29.00; No. 356, 26.50, 50 lb ingots.

Antimony: R.M.M. brand, 95.5%, 32.50; Lone Star brand, 33.00, f.o.b. Laredo, Tex. in bulk. Foreign brands, 99.5%, 30.50-31.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $70.00 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $85 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.75% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.

Cobalt: 99+%, $1.50 per lb for 500-lb keg; $1.52 per lb for 100 lb case; $1.57 per lb under 100 lb.

Columbium: Powder, $40 per lb and up nom.

Copper: Electrolytic, 31.00 deld; custom smelters, 31.00 nom; lake, 31.00 deld; fire refined, 30.75 deld.

Germanium: Purified, ingots, less than 1 kg 37.50 per gram; 1-10 kg 32.00 per gram; 10 kg or more, 29.95 per gram; intrinsic grade, under 10 kg, 31.95 per gram; 10 kg or more, 29.95 per gram.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $70-75 per troy oz nom.

Lead: Common, 10.80; chemical, 10.90; corroding, 10.90; St. Louis, New York basis, add 0.20.

Lithium: 1 lb or 2 lb ingots, less than 24 lb, $11 per lb deld; 24-99 lb, $9.50; 100-449 lb, $9.25; 450 lb or more, $9 per lb, delivered.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex., 1.3 in. diam. x 12 in. sticks, 57.00 f.o.b. Madison, Ill.

Magnesium Alloy: AZ91A (diecasting), 40.75; AZ63A, AZ92A, AZ91C (sand casting), 40.75 f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $188-191 per 76 lb flask.

Molybdenum: Unalloyed forging billets, 4.125-8.5 in. diam., 50-4999 lb, $3.15 per lb, depending on quantity; 5000 lb or more, $3 per lb, f.o.b. Coldwater, Mich.

Nickel: Electrolytic cathodes, briquettes, sheets (4 x 4 in. and larger), unpacked, 81.25; 10-lb pig, unpacked, 89.00; "XX" nickel shot, 88.75; "F" nickel shot for addition to cast iron, in kegs, 81.75; "F" nickel, 5 lb ingots, 82.75. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.09; Exton, Pa., basis, add 1.60. Nickel oxide sinter at Buffalo, New York, or other established U. S. ports of entry, contained nickel 77.50.

Osmium: $70-90 per troy oz nom.

Palladium: $24-26 per troy oz.

Platinum: $82-85 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $137-140 per troy oz.

Ruthenium: $55-60 per troy oz.

Selenium: $6.50-7 per lb, commercial grade.

Silver: Open market, 91.375 per troy oz.

Sodium: Solid pack, c.l., 19.50; l.c.l., 20.00; 5 and 12 lb bricks, c.l., 21.00; l.c.l., 21.50; tank car, 17.00.

Tantalum: Melting stock, $35 per lb; rod, $60 per lb nom; sheet, $55 per lb nom.

Tellurium: $5.25 per lb, 100 lb or more.

Thallium: $7.50 per lb.

Tin: Straits, N. Y., spot and prompt, 121.625.

Titanium: Sponge, 99.3+% grade A-1, ductile (0.3% Fe max), $1.37 per lb; grade A-2 (0.5% Fe max), $1.50 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 100-lb lots, $2.75 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00c; 99+% hydrogen reduced, $3.25.

Zinc: Prime Western, 11.50; brass special 11.70; intermediate, 11.70, East St. Louis, freight allowed over 0.50 per lb. New York basis, add 0.50. High grade, 12.35; special high grade, 12.50 deld. Diecasting alloy ingot No. 3, 13.75; No. 2, 14.25; No. 5, 14.00 deld.

Zirconium: Reactor grade sponge, 100 lb or less, $7.25-7.75 per lb; 100-500 lb, $6.75-7.25 per lb; 500-1000 lb, $6.25-6.75; over 1000 lb, $6.25 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 24.25-26.00; No. 12 foundry alloy (No. 2 grade), 21.75-22.25; 5% silicon alloy, 0.60 Cu max, 23.50-24.00; 13 alloy, 0.60 Cu max, 23.50-24.00; 195 alloy, 24.75-25.75; 108 alloy, 22.25-22.75. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 23.25; grade 2, 22.00; grade 3, 21.00; grade 4, 20.00.

Brass Ingot: Red brass, No. 115, 32.00; tin bronze, No. 225, 41.25; No. 245, 35.75; high leaded tin bronze, No. 305, 36.00; No. 1 yellow, No. 405, 27.50; manganese bronze, No. 421, 31.25.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.25; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.955, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.955, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 20,000-lb lots, 36.35; l.c.l., 36.96. Weatherproof 20,000-lb lots, 37.05; l.c.l., 37.80.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $16.50 per cwt; pipe, full coils, $16.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheet and strip, $5.70-15.50; sheared mill plate, $4.45-9.00; wire, $5.00-9.50; forging billets, $3.00-4.75; hot-rolled and forged bars, $3.39-6.25.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 28.00; ribbon zinc in coils, 22.50; plates, 21.50.

ZIRCONIUM

Plate, $11.00-16.00; H.R. strip, $11.00-15.00; C.R. strip, $13.00-18.00; forged or H.R. bars, $11.00-15.00.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	147	126	145
Strip, C.R.	133	114	145
Plate, H.R.	134	116	133
Rod, Shapes, H.R.	116	95	116
Seamless Tubes	157	129	200

ALUMINUM

(Selected products and sizes)

Flat Sheets: 1100, 3003, and 5005, mill finish, 30,000 lb base f.o.b. customer custody.

Thickness Range (in.)	Width (in.)	Length Range (in.)	Price Range
0.250-0.183	24-72	72-180	45.40-48.00
0.183-0.154	24-72	72-180	45.40-48.00
0.154-0.120	24-72	72-180	45.90-48.80
0.120-0.096	24-72	72-180	45.90-48.80
0.096-0.076	24-72	72-180	46.40-50.30
0.076-0.060	24-72	72-180	46.90-51.10
0.060-0.047	24-72	72-180	47.40-52.30
0.047-0.037	24-72	72-180	47.90-53.70
0.037-0.030	24-72	72-180	48.40-55.30
0.030-0.023	24-60	72-180	48.90-57.10
0.023-0.018	24-48	72-144	49.40-57.40
0.018-0.014	24-48	72-144	51.20-58.00
0.014-0.011	24-48	72-144	53.50-60.00
0.011-0.0085	24-36	72-96	56.20
0.0085-0.007	24-36	72-96	59.20
0.007-0.006	24-36	72-96	62.50

ALUMINUM (continued)

Plates: 1100, 3003, and 5005, mill finish, 0, H12, and H14 tempers, 30,000 lb base f.o.b. customer custody.

Thickness Range (in.)	Width (in.)	Length Range (in.)	Price Range
3.000-2.000	6-144	72-240	46.10-51.00
2.000-1.251	6-144	72-240	46.50-51.30
1.251-0.751	6-144	72-240	45.50-50.60
0.751-0.250	6-144	72-240	45.50-50.60

Screw Machine Stock: 30,000 base, 12 ft lengths.

Diam (in.)*	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
0.125	74.90	77.30	....	....
0.188	63.20	63.20	....	80.10
0.250	60.00	62.60	72.70	74.10
0.375	59.20	63.80	71.00	72.00
	2011-T3	2017-T451	2011-T3	2017-T451
0.500	59.20	63.80	71.00	72.00
0.625	59.20	63.80	67.80	67.90
0.750	57.70	62.00	61.60	63.80
0.875	57.70	62.00	61.60	63.60
1.000	57.70	62.00	61.60	63.80
1.125	55.30	59.50	59.50	61.50
1.250	55.30	59.50	59.50	61.50
1.375	55.30	59.50	59.50	61.50
1.500	55.30	59.50	59.50	61.50
1.625	53.00	56.70	....	59.30
1.750	53.00	56.70	58.30	59.30
1.875	53.00	56.70	....	59.30
2.000	53.00	56.70	58.30	59.30
2.250	51.50	55.00	....	59.30
2.500	51.50	55.00	....	59.30
2.750	49.90	53.20	....	59.30
3.000	49.00	53.20	....	59.30
3.250	....	53.20	....	....
3.375	....	53.20	....	....

*Selected sizes.

Forging Stock: Rounds, Class 1, random length, diam., 0.375-8 in., "F" temper; 2014, 47.50-57.60; 6061, 43.50-57.60; 7075, 61.80-71.90; 7079, 66.80-76.90.

Pipe: ASA schedule 40, alloy 6063-T6, 3-40 ft lengths, plain ends, 90,000 lb base, dollars per ft. Nominal pipe sizes: 1 in., 32.00; 1¼ in., 43.40; 1½ in., 51.80; 2 in., 62.60; 3 in., 124.95; 4 in., 171.80; 5 in., 233.15; 6 in., 308.55; 8 in., 464.35; 10 in., 716.25 (3-24 ft lengths).

Extruded Solid Shapes

Factor	Alloy 6063-T5	Alloy 6062-T6
1-14	45.30-46.80	54.00-60.00
15-17	45.30-46.80	56.50-61.80
18-23	45.80-47.50	58.80-67.00
24-32	45.80-47.50	66.80-81.50
33-38	49.50-52.20	85.10-96.60
39-44	59.80-63.60	102.00-124.00

MAGNESIUM

Sheets and Plates: AZ31B standard grades, .032 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.00 in., 67.90. AZ31B spec. grades, .032 in., 171.30; .081 in., 108.80; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24.72 in. widths; .125 in., 74.90; .188 in., 71.70-72.70; .25-.75 in., 70.60-71.60. Tooling plate, 0.25-3.00 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grades (AZ31B)
6-8	65.30-67.60	84.60-87.40
12-14	65.30-67.60	85.70-88.00
24-26	66.10-68.40	90.60-91.30
36-38	71.50-75.30	104.20-105.30

NONFERROUS SCRAP

DEALER'S BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 24.75-25.25; No. 2 heavy copper and wire, 23.00-23.50; light copper 20.25-20.75; No. 1 composition red brass, 21.25-21.75; No. 1

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES d (Based on copper at 31.00c)		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tubes	Clean Heavy	Rod Ends	Clean Turnings
Copper	56.13b	50.36-51.36	....	57.32	27.00	27.00	26.25
Yellow Brass	49.27	35.77c	49.56	53.43	20.375	19.50c	18.50c
Low Brass, 80%	52.15	52.09	52.44	56.21	22.875	22.625	22.125
Red Brass, 85%	53.17	53.11	53.46	57.23	23.875	23.625	23.125
Com. Bronze, 90%	54.73	54.67	55.02	58.54	24.75	24.50	24.00
Manganese Bronze	57.69	51.27	61.54	....	19.25	19.00	18.50
Muntz Metal	51.94	47.25	....	....	19.125	18.875	18.375
Naval Brass	53.94	47.75	60.25	58.10	19.00	18.75	18.25
Silicon Bronze	61.39	60.58	60.68	79.80	26.50	26.25	25.75
Nickel Silver, 10%	65.56	67.16	66.91	....	26.00	25.75	13.00
Phos. Bronze, A-5%	76.97	77.47	76.72	78.90	28.50	28.25	27.25

a. Cents per lb, f.o.b. mill; freight allowed on 50 lb or more. b. Hot-rolled. c. Free cutting. d. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time of any or all kinds of scrap, add 1 cent per lb.

composition turnings, 20.25-20.75; new brass clippings, 18.50-19.00; light brass, 15.50-16.00; heavy yellow brass, 16.50-17.00; new brass rod ends, 17.50-18.00; auto radiators, unsweated, 17.50-18.00; cocks and faucets, 18.00-18.50; brass pipe, 18.00-18.50.

Lead: Soft scrap lead, 7.25-7.50; battery plates, 3.00-3.25; linotype and stereotype, 8.50-8.75; electrotype, 8.00-8.25; mixed babbitt, 10.00-10.50.

Monel: Clippings, 26.00-26.50; old sheets, 25.00-25.50; turnings, 18.50-19.00; rods, 25.00-25.50.

Nickel: Sheets and clips, 56.00-58.00; rolled anodes, 56.00-58.00; turnings, 43.00; rod ends, 56.00-58.00.

Zinc: Old zinc, 3.00-3.25; new diecast scrap, 3.00-3.50; old diecast scrap, 1.75-2.00.

Aluminum: Old castings and sheets, 8.50-9.00; clean borings and turnings, 4.00-4.50; segregated low copper clips, 10.75-11.25; segregated high copper clips, 9.75-10.25; mixed low copper clips, 10.25-10.75; mixed high copper clips, 9.75-10.25.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 9.50-10.00; clean borings and turnings, 7.00-7.50; segregated low copper clips, 14.50-15.00; segregated high copper clips, 13.00-13.50; mixed low copper clips, 12.50-13.00; mixed high copper clips, 12.00-12.50.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 10.50; clean borings and turnings, 8.50-9.00; segregated low copper clips, 13.50; segregated high copper clips, 13.00; mixed low copper clips, 13.00; mixed high copper clips, 12.50-13.00.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)
Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 57.00; light scrap, 52.00; turnings and borings, 37.00.
Copper and Brass: No. 1 heavy copper and wire, 28.50; No. 2 heavy copper and wire, 26.25; light copper, 24.00; refinery brass (60% copper) dry copper content, 25.375.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 28.50; No. 2 heavy copper and wire, 26.25-26.50; light copper, 24.00-24.50; No. 1 composition borings, 23.50-24.00; No. 1 composition solids, 24.50; heavy yellow brass solids, 19.00; yellow brass turnings, 18.00; radiators, 21.00-21.50.

Plating Material

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.60.
Copper: Flat-rolled, 47.50; oval, 44.50; electrodeposited, 37.50; cast, 42.50; 5000-10,000 lb quantities.
Nickel: Depolarized, less than 500 lb, 117.50; 500-1999 lb, 110.50; 2000-4999 lb, 107.00; 5000-29,999 lb, 106.00; 30,000 lb, 105.00. Carbonized, deduct 3 cents a lb.
Tin: Bar or slab, less than 200 lb, 139.50; 200-499 lb, 138.00; 500-999 lb, 137.50; 1000 lb or more, 137.00.
Zinc: Balls, 18.25; flat tops, 18.25; flats, 21.00; ovals, 20.25, ton lots.

CHEMICALS

Cadmium Oxide: $1.60 per lb in 100-lb drums.
Chromic Acid (flake): 100-2000 lb, 31.00; 2000-10,000 lb, 30.50; 10,000-20,000 lb, 30.00; 20,000 lb or more, 29.50.
Copper Cyanide: 100-200 lb, 65.90; 300-900 lb, 63.00; 1000-19,000 lb, 61.90.
Copper Sulphate: 100-1900 lb, 15.50; 2000-5900 lb, 13.50; 6000-11,900 lb, 13.25; 12,000-22,900 lb, 13.00; 23,000 lb or more, 12.50.
Nickel-Chloride: 100 lb, 47.50; 200 lb, 45.50; 300 lb, 44.50; 400-4900 lb, 42.50; 500-9900 lb, 40.50; 10,000 lb or more, 39.50.
Nickel Sulphate: 5000-22,999 lb, 31.00; 23,000-39,900 lb, 30.50; 40,000 lb or more, 30.00.
Sodium Cyanide (Cyanobrik): 200 lb, 23.80; 400-900 lb, 20.80; 1000-4900 lb, 19.80; 5000-19,900 lb, 18.80; 20,000 lb or more, 17.60.
Sodium Stannate: Less than 100 lb, 88.70; 100-600 lb, 79.00; 700-1900 lb, 76.30; 2000-9900 lb, 74.40; 10,000 lb or more, 73.10.
Stannous Chloride (Anhydrous): 100 lb, 147.80; 400 lb, 137.80; 800-19,900 lb, 116.50; 20,000 lb or more, 112.30.
Stannous Sulphate: Less than 50 lb, 155.10; 50 lb, 125.10; 100-1900 lb, 123.00; 2000 lb or more, 121.10.
Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

(Concluded from Page 119)

work under construction. However, contracting is active and considerable new work is being figured. The over-all tonnage of plain material placed with the mills for September shipment is slightly larger.

Heavier bridge tonnage is being estimated in New England, but private construction is lagging in the area. District fabricators who are meeting price competition have backlogs for capacity operations the rest of this year, but other shops need tonnage and are operating only part time.

American Bridge Div., Pittsburgh, U. S. Steel Corp., booked 25,000 tons for the bridge superstructure over the Taunton River, Fall River-Somerset, Mass. Bethlehem Steel Co. will fabricate 4950 tons for an office building in Hartford, Conn.

Important structural projects out for bids are lacking in the Pacific Northwest. Fabricators' backlogs are low.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

25,000 tons, bridge superstructure, Interstate Route 195 over Taunton River, Fall River-Somerset, Mass., to American Bridge Div., U. S. Steel Corp., Pittsburgh, $12,495,800; Harris Structural Steel Co. Inc., New York, second low bidder at $13,522,596.20, and Bethlehem Steel Co., Bethlehem, Pa., third at $13,804,520.

22,500 tons, superstructure, Sunshine toll bridge, Mississippi River, Donaldsonville, La., to American Bridge Div., Pittsburgh, U. S. Steel Corp.

2675 tons, jet overhaul facilities, International Airport, Miami, Fla., to American Bridge Div., Pittsburgh, U. S. Steel Corp., direct to Dade County Port Authority.

1780 tons, state highwaywork, FALIE 61-3, Suffolk County, New York, through Lizza & Sons Inc., Oyster Bay, N. Y., general contractor, to American Bridge Div., Pittsburgh, U. S. Steel Corp.

15,000 tons, Newburgh-Beacon Bridge superstructure, New York State Bridge Authority, Poughkeepsie, N. Y., to Bethlehem Steel Co., Bethlehem, Pa., recently noted as low bidder.

4700 tons, Theodore Roosevelt Bridge, Washington, D. C., through McCloskey & Co., Philadelphia, general contractor, to Nashville Bridge Co., Nashville, Tenn.

3800 tons, Southwest Freeway, Washington, D. C., through McCloskey & Co., Philadelphia, general contractor, to Nashville Bridge Co., Nashville, Tenn.

835 tons, Brooklyn-Queens Expressway, New York, through Gull Contracting Co., general contractor, to Irvington Steel & Iron Co., Irvington, N. J.

745 tons, Units No. 1 and No. 2, Wakefern Food Corp., Elizabeth, N. J., through Elberon Development Co. Inc., Hillside, N. J., to Bethlehem Steel Co., Bethlehem, Pa.

685 tons, state bridgework, FAHRD-61-1, New York County, New York, through Horn Construction Co., general contractor, to Bethlehem Steel Co., Bethlehem, Pa.

576 tons, office, Johnson & Johnson, New Brunswick, N. J., through John W. Ryan Construction Co., general contractor, to Irvington Steel & Iron Co., Irvington, N. J.

400 tons, Maxwell House Div., Hoboken, N. J., General Foods Corp., to Elizabeth Iron Works Inc., Union, N. J.

365 tons, two span, composite plate girder bridge, Main Street, Hartford, Conn., Proj. (1-84-3 (25)-62) to City Iron Works, Wethersfield, Conn.; Mariani Construction Co., New Haven, Conn., general contractor.

310 tons, state bridgework, Route 287, Sec. 12-A and 13-A, Morris County, New Jersey, through Franklin Contracting Co., to an unnamed fabricator.

255 tons, Big Sandy plant, Unit 1, Louisa, Ky., for Kentucky Power Co., to Mississippi Structural Steel Co., St. Louis.

158 tons, galvanized towers, American Electric Power Service Corp., Lawrenceburg, Ind., to Charles E. Schuler Engineering Co., Newark, Ohio.

150 tons, two pedestrian overpasses, Harlem River Drive, New York, through Uman Construction Co., general contractor, to J. K. Welding Co., Yonkers, N. Y.

STRUCTURAL STEEL PENDING

15,000 tons, state Gowanus Expressway, New York, Slattery Construction Co., low on general contract.

14,670 tons, state highwaywork, Northern Boulevard, Queens, New York; Slattery Construction Co. low on general contract.

5200 tons, state bridgework, Fire Island, Suffolk County, New York; bids closed Aug. 24.

5000 tons, 26 story office building, Detroit Bank & Trust Co., Detroit; Sam Minskoff & Sons Inc., New York, low on general contract.

4000 tons, 35 story office building, Park Avenue between 39th and 40th Streets, New York, for Carol Management Corp.; bids asked.

3500 tons, estimated, cargo terminal warehouse facilities, at Norfolk, Va., for Virginia Ports Authority, bids asked.

3113 tons, state highway bridges, Hartford and Wethersfield, Conn.; bids Aug. 28 to Hartford; also, 1586 tons of reinforcing bars, 615 tons of mat reinforcement, and 406 tons of steel piles.

3000 tons, Complex 37, Cape Canaveral, Fla.; bids closed Aug. 19.

1993 tons, state bridgework, FARC 61-129, Niagara County, New York; bids closed Aug. 24.

1700 tons, bridge, Cannonsville Reservoir, Delaware and Orange Counties, New York, for Board of New York Water Supply; bids

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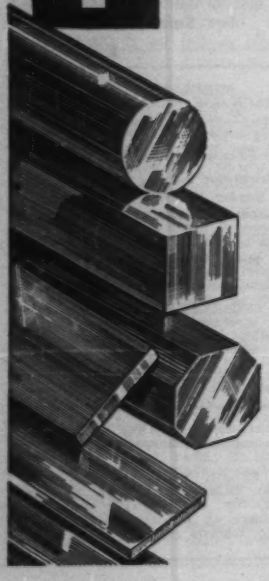

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WYCKOFF STEEL PRODUCTS • Carbon, Alloy and Leaded Steels • Turned and Polished Shafting • Turned and Ground Shafting • Large Squares • Wide Flats up to 12¾" x 2¼" and 14" x 1¼" • All types of Furnace Treated Steels including Carbon Corrected Steels

Aug. 29.

1200 tons, hangar, Eastern Air Lines, Atlanta; bids Sept. 11.

1200 tons, central laboratory and office, National Aeronautics & Space Administration, Huntsville, Ala.; E. M. F. Construction Co., New York, low on general contract.

1183 tons, state highwaywork, Route 287, Sec. 3-B, Middlesex County, New Jersey; Public Constructors, low on general contract.

1075 tons, railroad structures, relocation of Chicago, Burlington & Quincy Railroad, Norton Dam, Kans., bids Sept. 19 to the Bureau of Reclamation, Denver.

816 tons, four catapults, aircraft carriers; bids about Nov. 1, Naval Material Center, Philadelphia.

650 tons, Public School No. 242, Brooklyn, N. Y.; bids Aug. 28.

630 tons, coal conveyor system, Indiana-Michigan Electric Co., Lawrenceburg, Ind.; American Electric Power Service Corp., general contractor.

516 tons, including plates; bids Sept. 8, U. S. Coast Guard, Curtis Bay, Baltimore.

470 tons, six story office building, Harold Menowitz, Queens, New York; pending.

400 tons, apartment, 86th Street and East End Avenue, New York; pending.

362 tons, state bridgework, FSC-6607, Niagara County, New York; bids closed Aug. 24.

305 tons, state highway bridges, Project F-348, Worcester, Mass.; Suburban Excavators Inc., Wakefield, Mass., low on general contract.

234 tons, state bridgework, FAWB 61-6, Queens County, New York; Queens Structures Inc., low on general contract.

227 tons, state bridgework, FIRCH 61-128, Onondaga County, New York; B. W. Wineman, Syracuse, N. Y., low on general contract.

230 tons, state bridgework, Clinton-Potter Counties, Pennsylvania; bids Sept. 8; 100 tons of reinforcing bars also required.

156 tons, grade separation structure, Killingly, Conn.; bids Aug. 28; also required, 40 tons of concrete reinforcing bars.

155 tons, state highway bridge, Project 130-92, Southbury, Conn.; Charter Oak Construction Co., Hartford, Conn., low on general contract.

154 tons, state bridgework, FISH 61-17, Onondaga County, New York; bids closed Aug. 24.

138 tons, state highway bridge, Bethel, Maine; bids Aug. 30 to Augusta, Maine.

100 tons, production building, Lever Bros., Edgewater, N. J.; bids asked.

100 tons or more, cable car towers, Ice Harbor project; General Steel Erectors Inc., Caldwell, Idaho, low at $46,151 to the U. S. Engineer, Walla Walla, Wash.

REINFORCING BARS . . .

REINFORCING BARS PLACED

519 tons, two span, composite plate girder bridge, Main Street, Hartford, Conn., Proj. (1-84-3 (25)-62), to Bethlehem Steel Co., Bethlehem, Pa.; Mariani Construction Co., New Haven, Conn., general contractor; 281 tons of steel piles also to be placed.

1870 tons, West Park Housing Project, Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa.

545 tons, state bridgework, Bucks County, Pennsylvania, to Bethlehem Steel Co., Bethlehem, Pa.

245 tons, office, Hightstown, N. J., for McGraw-Hill Publishing Co. Inc., New York, to Bethlehem Steel Co., Bethlehem, Pa. 1530 tons of shapes for this project were placed with Bethlehem Fabricators, Allentown, Pa., noted recently.

185 tons, Idaho highway project, Canyon County, to unstated interest.

138 tons, dormitory, Seattle Pacific College, to Pacific Coast Div., Bethlehem Steel Co., Seattle; John H. Sellen Construction Co., Seattle, general contractor.

105 tons, also 40 tons of shapes, Washington State highway project, Whatcom County, to unstated interest; Lockyear & White, Longview, Wash., general contractor.

REINFORCING BARS PENDING

7500 tons, freeway section at Seattle; bids to Washington State, Olympia, Sept. 12.

1414 tons, spillway, Proctor Reservoir, Co-

manche County, Texas; bids Sept. 21 to the U. S. Engineer, Ft. Worth, Tex.

225 tons, Idaho state highway project, Bannock County; Jack B. Parsons Construction Co., Southfield, Utah, apparently low at $1,370,125.

210 tons, Washington State overpass, Pierce County; bids to Olympia, Wash., Sept. 6.

200 tons, Washington State span, Whitman County; general contract to Peter Kiewit Sons Co., Vancouver, Wash., low at $886,402.

150 tons, three bridges, Springfield, Mass.; M. DeMatteo Construction Co. Inc., Quincy, Mass., low on the general contract; also required, 757 tons of steel bearing piles, and 140 tons of steel sheet piling.

100 tons or more, junior high school, Wenatchee, Wash.; Armstrong & Armstrong, Wenatchee, low bidder at $720,200.

100 tons or more, Meany Junior High School, Seattle; Wick Construction Co., Seattle, low bidder at $972,908.

65 tons, Washington State bridge, Klickitat County; bids to Olympia, Wash., Sept. 6.

50 tons, sewer project, Mercer Island; Soule Steel Co., Seattle, low at $11,396.

Unstated tonnage, four story courthouse addition, Yakima, Wash.; W. M. Yeaman, Yakima, is low bidder at $1,134,871.

Unstated tonnage, missile assembly buildings Seattle; bids to Boeing Co., Seattle, Sept. 6.

PLATES . . .

PLATES PLACED

845 tons, one kiln shell, Joppa, Ill., to F. L. Smidth & Co., Jersey City, N. J.

277 tons, hull steel, Military Industrial Supply Agency, Navy, Philadelphia, to South Asia Corp., New York.

260 tons, hull steel, Military Industrial Supply Agency, Navy, Philadelphia, to Bethlehem Steel Export Corp., New York.

243 tons, hull steel, Military Industrial Supply Agency, Navy, Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa.

189 tons, hull steel, Military Industrial Supply Agency, Navy, Philadelphia, to Caine Steel Co., Philadelphia.

120 tons, water storage tank, Opportunity, Wash., to Chicago Bridge & Iron Co., Seattle, low at $108,845.

100 tons, water storage tank, Gold Beach, Oreg., to American Pipe & Construction Co., Portland, Oreg.

100 tons, also 100 tons of reinforcing bars, additional awards Aberdeen, Wash., water supply line, to United Concrete Pipe Corp., Auburn, Wash.

PLATES PENDING

100 tons plus, diversion tunnel and spillway, Round Butte Dam, Oregon; general contract to Peter Kiewit Sons Co., Vancouver, Wash., by Portland General Electric Co.

PIPE . . .

CAST IRON PIPE PLACED

183 tons, 6 and 8 in., Anchorage, Alaska, to U. S. Pipe & Foundry Co., Seattle.

114 tons, 8 and 12 in., Renton, Wash., to Pacific States Cast Iron Pipe Co., Seattle.

108 tons, including 64 tons for Seattle and 44 tons for Olympia National Park, Wash., to U. S. Pipe & Foundry Co., Seattle.

CAST IRON PIPE PENDING

150 tons, 10 in.; bids to Alfred B. Loop, comptroller, Bellingham, Wash., Sept. 5.

85 tons, 12 in., Montlake Terrace, Wash.; bids in.

STEEL PIPE PLACED

206 tons, fabricated pipe, Pennsylvania Power & Light Co., Allentown, Pa., to the Bethlehem Steel Co., Bethlehem, Pa.

RAILS, CARS . . .

RAILROAD CARS PLACED

Canadian National, 150 boxcars, to Canadian Car & Foundry Co., Montreal, Canada.

Norfolk & Western, 100 seventy-ton pulpwood cars, to its Princeton, W. Va., shops.

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Automation Makes More Jobs

COMING IN Sept. 4

STEEL

Automation is America's biggest job maker, not the ominous threat to employment that union leaders and others claim. So, to create more jobs, we need more automation, not less.

That's the thesis of STEEL's next impact issue, Sept. 4. A team of ten editors has been working on the special report since May. The regular format for the issue will be discarded, and we'll bring you a 40-page survey in depth on automation and its effects on jobs.

The Sept. 4 study will be STEEL's fourth Impact Issue, a new kind of business paper reporting.

HOUGHTON HEAT TREATING SALTS

Test salt bath neutrality quicker with a razor blade

Liquid salt baths have long been recognized for their stability, freedom from decarb and the protection they afford the surface being treated.

Regardless of the inherent stability of molten salts, however, they do occasionally become contaminated which may result in decarburization. When this happens the metallurgist can use a simple homespun method to determine the bath's neutrality.

The hard way is a metallographic check, which involves cleaning, sectioning, mounting, polishing, etching and examining a specimen under the microscope. This is costly and time-consuming.

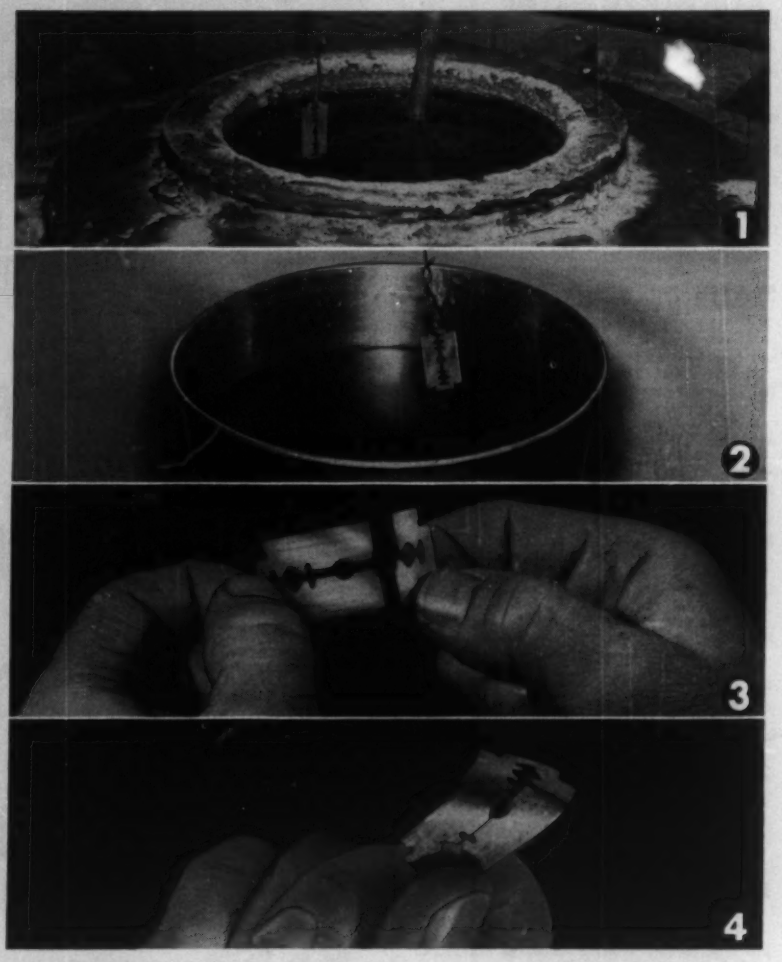
The simple way requires only an old razor blade, the double-edge type, and not one made of austenitic stainless steel. This method has been found very practical and accurate.

The blade is hung on a wire and dipped into the hardening bath of molten salt (photo no. 1), leaving it immersed for about the same time as the work being regularly heated there, and at the same temperature. Then it is quenched rapidly in water (photo no. 2).

Now for the simple bending and breaking test. Hold the blade in two hands and bend it. If it breaks with a brittle fracture (photo no. 3), the bath is neutral—no tendency to decarb. But if it bends before breaking (photo no. 4), this evidence of ductility indicates that the bath is decarburizing.

The ductility or absence of ductility indicates the condition of the salt bath. If the blade is ductile and can be bent 90° or 180° before fracturing, the steel is partially or completely decarburized. If the blade is not ductile but breaks with a brittle fracture, the bath is in good condition and work may be processed satisfactorily.

This simple test saves much time and the need for expensive metallographic equipment. It is not 100% sure, but our metallurgical friends find it very helpful for a quick and revealing test of the effect of molten salt on metal.



Heat treaters have come to expect the best from Houghton. And along with product purity, speedy delivery and well packaged materials "the best" includes assistance and cost-saving "hints" such as the razor blade test. Houghton makes and services salts for carburizing, hardening, annealing, tempering, quenching and nitriding. For the Salt Bath Catalog, write E. F. Houghton & Co., 303 W. Lehigh Avenue, Philadelphia 33, Pa.

Houghton

INDUSTRY'S PARTNER IN PRODUCTION

BIG JOB...
Bigger results with ROTOBLAST!

Day in, day out, seven heavy duty Rotoblasts work hard at cleaning the tremendous volume of castings produced at a large famous automotive foundry in the Midwest. At last count, each of the seven barrels had accumulated more than 600 hours of actual blast time with practically no need for maintenance or repairs.

Proof of the almost completely automatic operation of these machines is that just two men operate a line of six. (The seventh has a separate location for materials handling convenience.)

Whether your cleaning needs are big or small, Rotoblast has a standard type and size for the job, or specially designed equipment can be provided. Labor-saving automation can be furnished in a small unit just as easily as in seven big ones.

Try Rotoblast abrasives, too!

A special heat-treating process makes Rotoblast Steel Shot and Grit solid, tough, able to take more punishment than ordinary abrasives. Because they are *extra* tough, Rotoblast abrasives last longer, work harder and lower your replenishing costs. We'll be glad to go into more detail. Just write:

PANGBORN CORPORATION, 1600 Pangborn Blvd., Hagerstown, Md.; Pangborn Canada, Ltd., 47 Shaft Road, Toronto (Rexdale), Canada—*Manufacturers of Blast Cleaning, Vibratory Finishing, Dust Control Equipment; Rotoblast® Steel Shot and Grit®.*

Pangborn
OF HAGERSTOWN